Annual Subsidies Report for the Thane Municipal Corporation India

Final Report

Prepared for **The Financial Institutions Reform and Expansion (FIRE)-D II Project**

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This report is the culmination of six months of participatory research on a project that sought to provide a framework for estimating subsidies in urban public transport operations in Maharashtra. Since the approach to the project was to develop a case study of a municipal transport operator to understand the financial and institutional structure of the municipal public transport sector in Maharashtra, this project would not have been possible without the active support and cooperation of the stakeholders from public transport sector in the selected city, Thane. Finally, we would also like to acknowledge the inputs provided by a number of sector experts. A list of some of the people who spared some of their valuable time for discussions with the project team is given in Annex A.

Thanks are also due to Ms. Sonia Khanduri for secretarial assistance.

Abbreviations

ACC	Annualized Capital Costs
ASR	Annual Subsidies Report
BMTC	Bangalore Metropolitan Transport Corporation
BPMC	Bombay Provincial Municipal Corporation
CRF	Capital Recovery Factor
CSTC	Calcutta State Transport Corporation
DTC	Delhi Transport Corporation
FIRE	Financial Institutions Reform and Expansion
IDBI	Industrial Development Bank of India
MMRDA	Maharashtra Metropolitan Region Development Authority
MSRTC	Maharashtra State Roadways Transport Corporation
NTE	Non-Traffic Earnings
PLR	Prime Lending Rates
RTA	Regional Transport Authority
SPVs	Special Purpose Vehicles
SRTUs	State Road Transport Undertakings
STA	State Transport Authority
TAC	Total Annual Costs
TAR	Total Annual Revenue
TMC	Thane Municipal Corporation
TMTU	Thane Municipal Transport Undertaking
VRS	Voluntary Retirement Scheme

Executive Summary

Thane has grown rapidly in the last two decades from 0.8 million persons in 1991 to 1.26 million. The only means of intra-city public transport available in Thane is the TMTU (Thane Municipal Transport Undertaking) buses. The TMTU began its operations with a meager fleet strength of 28 buses that has now risen to 264. However, growth in public transport has been slow in comparison to the growth in population. Going by the standard of 300 buses per million people, the TMTU should be operating over 380 buses. This inability of the TMTU to provide adequate public transport has manifested itself in a prolific growth of privately owned vehicles. A correction in the present situation requires substantial investments in public transport operations.

Moreover, the TMTU has been consistently incurring substantial losses for the past few years. Its total expenditure has increased over 27 times since its inception, while revenue increased 24 times. In addition, there is potential for improvement in operational performance with the consequent reduction in losses. Because of the recent continuing losses, the TMTU has been unable to generate adequate funds for capital expenses or replacement of rolling stock. The consequent financial crunch has severely limited the TMTU's ability to provide efficient public transport services in Thane. This has serious repercussions in the likelihood of discontinuance of the past practice of fleet augmentation being financed by capital grants from the Thane Municipal Corporation.

Subsidies in Public Transport Provisioning

Assessing the annual subsidies in public transport provisioning would enable decision-makers to make informed choices about tariffs, service levels, capital investments, and overall transport policies. The total annual cost incurred by the TMTU for the financial year 2002/03 has been calculated to be approximately 525 million rupees. The total annual revenue generated by the TMTU during 2002/03 is about Rs. 448 million. Most of this revenue has been generated through the sale of tickets and concession passes, collectively referred to as Traffic Earnings, while Non-Traffic Earnings accounted for Rs. 5.31 million.

Consequently, the deficit or the subsidy in public transport services in 2002/03 is Rs. 76.70 million.

Potential for Efficiency Improvement

There is potential for improving the TMTU's operational performance that would lead to lower costs and higher revenues. A higher capacity utilization of the TMTU buses should imply a higher number of effective kilometers and hence lower fixed cost per unit of travel. Similarly, a higher capacity utilization with a higher Load Factor should yield more passengers per kilometer and more kilometers, and hence a higher revenue. Improved fuel efficiency would lead to lower costs because of fuel consumption. Hence, it is recommended that the TMTU should improve its capital utilization significantly to 250 km per bus per day with at least 95% of its fleet on the road daily. In addition, at least 95% of its seating capacity should be used on average. Finally, maintenance practices should be improved to obtain at least 4.5 kmpl (kilometers per liter) of diesel consumed. With improvements in these, the TMTU would be able to generate a surplus of Rs. 87 million. The strategies for achieving these efficiency improvements are detailed in the last section.

In addition, employee compensation forms over 35% of the total costs in the TMTU and is by far the largest cost component. Within this, salaries in the traffic department, that is of drivers and conductors, comprise over 28%. Hence, improving employee productivity could be the single most important factor in reducing costs. The exact number of employees required by the TMTU is a function of the number of buses that they operate. In order to determine the exact number of employees required and the number that is likely to be in excess, the TMTU's staff to bus ratio for drivers, conductors, administrative personnel, and traffic supervisors was compared with those of other urban SRTUs. Based on this analysis, there would be a surplus of 501 conductors and 347 drivers in the TMTU. Similarly, there would be a surplus of 88 in repairs and maintenance staff, 16 administrative staff, and 119 traffic supervisors. It would be necessary either to find areas where this surplus could be redeployed or to offer them an attractive VRS.

Subsidy Beneficiaries and Fare Structure

The TMTU has a multiple stage telescopic fare structure, that is, the fare per kilometer falls as the travel distance increases. The fares for monthly passes are based on the assumption that a person makes two trips per day and that the pass is used for 26 days in a month. Specific commuter categories are entitled to

cheaper fares. These include students, physically challenged commuters, freedom fighters, senior citizens, and police personnel. In terms of the general fare, trips beyond 5 kms yield more to the TMTU by way of fares than they cost. However, subsidized categories of commuters, students, freedom fighters, police personnel, physically challenged persons, and senior citizens impose a net cost burden on the TMTU.

Reducing Subsidies

As is evident from the discussion above, it is possible to reduce subsidies through efficiency improvements and effective targeting of the subsidy. This would reduce the budgetary support required by the TMTU to enable an expansion of public transport services in the city.

Improved Vehicle Maintenance

Maintenance strategies depend on the operational goals and policies of the service provider. Intensive vehicle maintenance entails higher costs but provides better quality service in terms of near-zero breakdown rates, punctuality, and reliability of service. Modest or no vehicle maintenance, on the other hand, requires less investment, but is accompanied by fall in the load factor and revenue. The TMTU is not inclined towards quality of service due to lack of regulatory pressure and the presence of financial constraints. The first step towards improving operational performance, and thereby reducing operating costs, is the formulation of a strategy, and its consequent operational objectives, goals, and policies, which will balance cost reduction with revenue generation. The three important areas that can reduce operating costs and improve fuel efficiency in the TMTU are selection of spares and tyres, bus replacement policy, and bus selection policy. A detailed assessment of the vehicle maintenance practices in the TMTU is necessary to develop specific strategies for implementing these policies.

Route Rationalization

Analyses of spatio-temporal diurnal variations that exist in the demand for public transport in Thane can enhance the efficiency of public buses. A route rationalization exercise would be a useful tool in this regard. This exercise would document the existing routes, route length, daily temporal variations in traffic on each route, buses plying on each route, their frequency, and number of passenger per trip per route. This exercise would highlight the existing demand-supply gap and identify profitable routes. The information collected by this

exercise would be useful for the TMTU to optimize bus utilization. The Motor Vehicles Act, 1988, provides sufficient authority to the TMTU to carry out such an exercise and advise the STA. Since Thane is a circular city, it lends itself to a star-and-hub type of route network model.

Tariff Policy

Tariff determination is the key to creating an enabling environment for dynamic and sustainable growth in the transport sector. The fundamental principle of tariff determination is to ensure that prices lead to an optimum level of investment, operation, and demand in the sector.

There may be a conflict between the different objectives. For instance, increasing the share of public transport and issues of social sustainability would require that the fares be kept sufficiently low, while efficiency improvement and viability issues may require periodic fare increases. The regulatory agencies in this sector must balance these objectives to achieve a sustainable outcome. Similarly, to ensure environmental and social sustainability, it may be necessary to subsidize public transport operations.

Tariffs should also provide incentives for efficiency improvements to reduce the cost of operation. It is also imperative that external costs such as congestion and pollution be incorporated into the fare determination process to reflect the true economic value of the service delivered.

The need for a subsidy should be assessed rather than assumed to exist, because the inclusion of unintended beneficiaries reduces the efficiency of the subsidy and increases the burden on the taxpayer. Wherever the government desires that a particular class of consumers be provided public transport services at subsidized fares, it is recommended that the allocation be made explicitly by the exchequer.

Finally, fare revisions should be rationalized and made systematic. Such a mechanism should be reasonable, transparent, and accepted by both the passenger and the operator.

Resource Mobilization from Diversifying Activities

Apart from operating bus services, the TMTU maintains infrastructure for repairing and maintaining buses. It also provides land for parking buses (at depots) and passenger terminals for traffic interchanges. It is recommend that these three distinct activities be unbundled into separate profit centers, and opportunities to obtaining capital investment from non-governmental sources be explored. The unbundling of TMTU would have to be preceded by financial

restructuring, along with apportioning the liabilities and assets of TMTU across the three proposed companies, structuring the debt and equity of each company, etc. based on the broad principles for allocation of assets that have been suggested.

City Bus Operations

Greater private sector participation in public bus operations is recommended. Using its own buses puts a tremendous strain on already stressed public funds. Consequently, the TMTU should save on capital investments by adopting the Kilometer Scheme where bus services would be procured from the private sector within the overall supervision of the SRTU. Over time the TMTU should stop replenishing their fleets using contracted services as a substitute. With a gradual growth in the operations of the private sector, it would be possible for the TMTU to withdraw completely from plying public buses and only regulate the sector.

Depots and Terminals

Ownership and management of depots, terminals, and bus stations is a natural monopoly and it would be inefficient for a multiplicity of operators to perform this function. Unbundling this activity from bus operations by setting up a separate corporation would be necessary for it to function as a profit center. This corporation should enter into contracts with any operator to allow parking within its depots at Kalwa and Wagle at an appropriate fee. It could also lease out space for repair facilities to either the workshop company or a private workshop at these depots. Such a company could also earn substantial revenues through property development and advertising at bus terminals and bus stations such as at the Thane Railway Station.

However, it is important to recognize that commercial development of the property allocated to this company could be more remunerative than providing parking facilities for buses, or interchanges for passengers. Hence, it is recommended that while the company should operate only on commercial considerations, for commercial development of its properties it would need approval of the appropriate regulatory agency such as the STA.

Repairs and Maintenance Workshops

Management of the workshops and repair facilities is not a natural monopoly; there are several private workshops at which repairs could be carried out and there is no need for public funds to be spent on these facilities. However, since the TMTU already has substantial infrastructure for repairs, it is recommended

that these be used to service even the private vehicle fleet. Such workshops could also be declared Authorized Testing Stations to issue Certificates of Fitness as per the requirements of Section 56 of the Motor Vehicle Act, 1988, which would supplement their income.

Need for an Urban Transport Policy

The strategies suggested above would check the decline in the share of public transport in Thane and ensure that issues of social and economic sustainability in providing public transport are addressed. However, just as in any other city, improvements in public transport operations would need to be accompanied by other actions for a significant improvement in the entire transport sector to meet the goals of social, environmental, and economic sustainability. It is necessary to develop a coordinated action plan addressing the concerns in the entire transport sector to complement the above described reform process.

This calls for the development of an urban transport policy for Thane that promotes cost-effective initiatives, mitigates adverse environmental effects while taking account of development priorities as well as social and poverty-related concerns. An integrated approach for the entire transport sector would ensure that different modes of transport develop to complement one another. Mechanisms for integrated transport planning strategies need to be developed concurrently with urban and regional settlement strategies to ensure that environmental impacts of transport are minimized while social and economic objectives are met.

1 Introduction

The legislation for municipal corporations in Maharashtra, the BPMC (Bombay Provincial Municipal Corporation) Act, 1949, mandates all municipal corporations to submit an ASR (Annual Subsidies Report) at the time of presenting the municipal budget. The ASR is meant to enable decision-makers to make informed choices about tariffs, service levels, capital investments, and overall transport policies. In 2001, the state government's Urban Development Department directed municipal corporations to initiate action toward complying with this provision of the Act. The Thane Municipal Corporation approached the FIRE-D II Project for support in the preparation of the first ASR for the city. FIRE undertook this task with the dual objective of meeting the state legislative mandate and serving as a case for providing inputs for the development of the state-level framework. An ASR covering water supply and sewerage, solid waste management, education, and health was submitted by FIRE to the Thane Municipal Corporation in April 2002. Based on this report, a workbook has been developed to enable other municipal corporations in Maharashtra to carry out the ASR exercise for these sectors independently.

TERI has been engaged by the FIRE-D II Project to prepare the ASR for the municipal transport sector in Thane and develop, on its basis, a draft workbook with the objective of enabling other municipal corporations in Maharashtra to meet all the requirements of the legislation. This is the ASR's final report for the Thane Municipal Transport Undertaking.

Objectives

The study developed an Annual Subsidy Report for the Thane Municipal Transport Undertaking in response to the requirements for preparing the Annual Subsidies Report by Municipal Corporations in the BPMC Act 1994. Based on this exercise, TERI would develop and test corresponding workbook formats for incorporation into the fifth chapter of the workbook developed by FIRE.

The detailed scope of the project is as follows:

1 Prepare an Annual Subsidy Report to quantify the extent of subsidy in the provision of municipal transport (Thane Municipal Transport Undertaking). This will include the following:
   - Analysis of the transportation budget including:
     (a) Developing the methodology to quantify the extent of subsidy.
     (b) Assessing the loss in revenue arising from the shortfall in revenue collection.
     (c) Estimating the cost of service delivery attributable to inefficient operation.
   - Identification of sources for the subsidy.
   - Identification of beneficiaries of the subsidy.
   - Discussions with the Municipal Commissioner, Transport Manager, and other staff to identify measures of reducing the subsidy and to recommend strategies for reducing the subsidy burden.

2 Develop methodology and formats, which, once accepted, will be incorporated into the fifth chapter of the workbook developed by the FIRE office. This will include:
   - Development and description of methodology.
   - Development of formats, which can be used as standardized templates across other cities in Maharashtra for quantification of the subsidy for transportation services.
   - Assist FIRE in testing the format in four cities, and modify it.

Methodology and Approach

The project was executed through a combination of literature surveys, interaction with experts, and discussions with agencies and organizations in this sector.

Literature Review and Data Analysis

Various policy documents, conference documents and proceedings, books, journals, and laws and regulations governing the TMTU were examined to identify reform issues in the public transport sector in Thane and the concerns involved therein. In addition, data on various facets of the TMTU's functioning was collected and analyzed. This involved a detailed assessment of the TMTU's annual budgets, profit and loss accounts for the last ten years, and monthly financial statements.

Development of Strategies

Based on the results of the review of the current processes of provisioning public transport, reforms have been suggested. These include recommendations on changes in policy, institutional, and regulatory arrangements, improving the financial viability of the sector, and strategies for increasing efficiency.

Consensus Building

It is desirable that the reform process has the support of the community and the stakeholders in the sector. To ensure this, the process adopted was consultative. Extensive consultations were carried out with the TMTU in the course of the analysis. Presentations were made to the TMTU and the Transport Committee on the need for reforms, their contents, and their benefits. Discussions, subsequent to presentations, were also held with the Municipal Commissioner.

Structure of the Report

The following chapter provides a description of the public transport sector in Thane in the institutional and regulatory context of public transport provisioning in India, and emphasizes the need for financial reforms. Chapter 3 details the methodology for estimating the annual subsidies in public transport operations in Thane and estimates them for the period 1998/99 to 2002/03. The next chapter benchmarks the performance of the Thane Municipal Transport Undertaking against other similar urban transport corporations and identifies areas with potential for efficiency improvement. Chapter 5 lists the beneficiaries of subsidies in public transport operations. Finally, Chapter 6 identifies directions for reforms to effect reduction in subsidies in public transport operations in Thane.

2 Public Transport in Thane

The transport sector in India has witnessed rapid growth in the last decade. There were nearly 50 million vehicles registered on 31 March 2000. Simultaneously, there has been a gradual reduction in the share of public transport with the proportion of registered buses declining from over 11% in 1951 to just over 1% in 1998. The decline in the penetration of public transport has led to a greater dependence on personal modes of transport, which are more energy-intensive, occupy more road space per person, and have higher levels of emissions per passenger kilometer traveled.

Since transport plays a significant role in the overall development of a nation's economy especially in cities, which are considered vertices of economic growth, concerns are being voiced about the sustainability of the sector. The rapid increase in the number of motor vehicles in India calls for urgent measures dealing with the resultant congestion and pollution. An effective method of resolving this problem would be to encourage the use of public transport. This would require an increase in the capacity of public transport as also an improvement in the service quality. These strategies call for greater investments in providing public transport and improved operational performance. This chapter discusses these issues and concerns in the public transport sector in Thane, and outlines the need for reforms.

Transport Sector in Thane

Thane is located almost 19 km inland on the northeastern aspect of Greater Mumbai. Given the strong economic 'pull' factor of Mumbai, Thane has long been in the shadow of this metropolis. The primary role of the city has been that of being a 'dormitory town' serving the residential needs of people working in Mumbai, given the opportunity afforded by good inter-city transportation. However, the growth of the city has been rapid in the last two decades owing to the creation of industrial estates. In the last decade, the growth rate touched 57.5% and the population of the city grew from 0.8 million in 1991 to 1.26 million according to the Census of India 2001 (Provisional) Results. This growth has been aided by the presence of important roadways, namely National Highway 3, connecting Mumbai and Agra, National Highway 4 connecting

Mumbai, Pune, and Bangalore, and the Eastern Express Highway. Major north-south railway corridors run through the city and it is served by a large number of suburban and long-distance trains.

The growth of Thane City has been in a radial fashion, emerging from the Central Business District area, in the western aspect, and adjoining the railway station. Spanning an area of 128.23 sq. km., densities within Thane range between 30 and 1,360 people per hectare. This variation is of considerable significance when viewed in the context of public transport since such high densities usually indicate higher concentration of workplaces.

Public Transport in Thane

Urban public transport is primarily road based with approximately 80% of the total passenger movement in the country being met by road transport. Road transport in urban locations is operated partly by the public sector, but largely by the private sector, which owns about 28.7% and 71.3%, respectively, of the total number of buses. The participation of the state in road transport commenced in 1950 and since then the SRTUs (State Road Transport Undertaking) have been formed in every state. The TMTU (Thane Municipal Transport Undertaking) is one such SRTU.

The only means of intra-city public transport available in Thane is the TMTU buses. Before it was created in 1988/89 by the TMC (Thane Municipal Corporation) under the provisions of the BPMC Act of 1949, the MSRTC (Maharashtra State Road Transport Corporation) provided public transport. While the TMTU is independent in its functioning, it depends on the TMC for annual grants to bridge the deficit between expenditure and revenue. These grants are directed towards meeting operating and maintenance expenditure, and, at times, for capital expenses such as purchase of buses, vehicles, machinery, equipment, etc. The TMTU has accessed loans from financial institutions such as the IDBI (Industrial Development Bank of India) and the MMRDA (Maharashtra Metropolitan Region Development Authority).

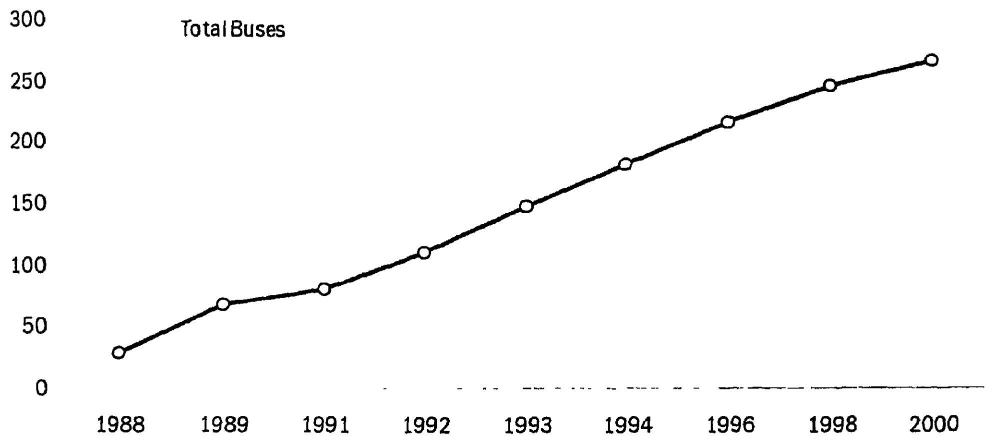


Figure 2.1 Growth in Total Fleet Strength of Buses operated by Thane Municipal Transport Undertaking

Source. TMTU (2002)

The TMTU began its operations with a meager fleet strength of 28 buses that has now risen to 264[a] (Figure 2.1). The first batch of buses purchased in 1989 is due to be replaced in 2003 assuming a life span of 15 years. However, the growth in public transport has been slow in comparison to the growth in population. Going by the standard of 300 buses per million people, the TMTU should be operating over 380 buses (CIRT 2001).

The failure of the TMTU to provide adequate public transport has manifested itself in a prolific growth rate of privately owned vehicles. An average annual growth rate of 26.44% has been observed in the case of autorickshaws that are an alternative to public transport. The average growth rate of private modes of transport was of 7.17% between 1995 and 1999 (Table 2.1).

[a] In addition, four buses have been converted to provide mobile repair and maintenance facilities.

Table 2.1 Growth in Number of Registered Motor Vehicles in Thane

Year	2-Wheelers	3-wheelers (Passenger)	3-wheelers (Goods)	Four wheelers	Buses	Trucks	Tractors	Trailers	Others	All vehicles
1995	44843	7657	2132	14209	1560	13075	198	483	389	84546
	(53.04%)	(9.06%)	(2.52%)	(16.81%)	(1.85%)	(15.46%)	(0.23%)	(0.57%)	(0.46%)	
1996	45834	9762	2215	14464	1560	13368	199	491	389	88282
	(51.92%)	(11.06%)	(2.51%)	(16.38%)	(1.77%)	(15.14%)	(0.23%)	(0.56%)	(0.44%)	
1997	48941	11091	2491	15176	1560	14031	201	496	389	94376
	(51.86%)	(11.75%)	(2.64%)	(16.08%)	(1.65%)	(14.87%)	(0.21%)	(0.53%)	(0.41%)	
1998	51018	12312	2913	16285	1560	14709	201	510	389	99897
	(51.07%)	(12.32%)	(2.92%)	(16.30%)	(1.56%)	(14.72%)	(0.20%)	(0.51%)	(0.39%)	
1999	54485	19571	3209	18746	1560	16204	202	519	389	114885
	(47.43%)	(17.04%)	(2.79%)	(16.32%)	(1.36%)	(14.10%)	(0.18%)	(0.45%)	(0.34%)	
Average Annual Growth Rate (%)										
	4.99	26.44	10.76	7.17	0.00	5.51	0.50	1.81	0.00	7.97

Source. CES and others (2002)
Figures in parenthesis are % of the total

This has made traffic management more difficult (CIRT 2001) since road space has not increased commensurately. Another fall out is increased congestion leading to reduced vehicle speed and additional fuel consumption, and pollution.

itutional Structure of Thane Municipal Transport Undertaking

The functioning of the TMTU is governed by the provisions of the BPMC Act, 1949 and is applicable to all municipal corporations in Maharashtra, except Mumbai. This is the enabling legislation for the creation of the TMTU. It permits the municipal corporations to create public transport undertakings, and operate in the manner permitted under the Motor Vehicles Act, 1988. Under this Act, the TMC is required to create or acquire a municipal transport undertaking with the objective of providing for mass transport in Thane. The main decision-making body of the TMTU is the Transport Committee that comprises of 13 members, of which, one post is reserved ex-officio for the Chairman of the Standing Committee of the Thane Municipal Corporation. The remaining 12 members are all appointed by the TMC. They can either be elected councilors, or experts in urban public transport, administration, transport, engineering, industrial, commercial, financial, and/or labor.

The TMTU is broadly divided into three departments: administration, traffic, and workshop. The Transport Manager, under the superintendence of the Transport Committee and the TMC, manages the TMTU. The Transport

Manager is required to ensure economical and efficient maintenance, operation, administration, and development of the TMTU. The Transport Manager is also empowered, with approval from the Transport Committee on behalf of the TMC, to purchase, sell, hire, or lease any immovable and movable properties belonging to the TMC but being used by the TMTU. The TMTU, being a subsidiary of the TMC, is financed by the TMC if sufficient revenue cannot be generated to meet the expenses. The Transport Committee determines all fare revisions and the applicability of leviable charges subject to norms and regulations laid down by the state government.

Legislative Environment

The Motor Vehicles Act, 1988, provides for two types of bus services, stage carriages and contract carriages. Public transport services are provided by stage carriage buses where fares are charged of individual passengers either for the entire journey or for stages of it. Contract carriage buses, on the other hand, essentially are buses licensed to be used by either individuals or companies for their own use, or for leasing. The fare or compensation payable for hiring of contract carriages has to be on a time basis or on a point-to-point basis. Contract carriages are not allowed to pick up or set down passengers en route. Permits for both these services are to be obtained from a RTA (Regional Transport Authority) or STA (State Transport Authority). In granting a stage carriage permit, conditions such as the area or route, the minimum and maximum number of daily trips, the minimum and maximum number of passengers, specifications with regard to the body of the vehicle, standards of comfort and cleanliness, and fares that may be charged, may be imposed.

Chapter VI of the Motor Vehicles Act has special provisions for the State Transport Corporations. If a state government is of the opinion that for providing a road transport service, it is necessary that such services be run and operated only by the SRTU and to the exclusion of any other operator, then the state government may implement such a scheme after it has formulated a proposal and given an opportunity to interested people to file their objections. Once such a scheme is finally notified, the SRTU may apply for permits as per the scheme and the required permits shall be granted by the STA. The STA may refuse to entertain applications for permits from others and even cancel or modify the terms of any existing permit. The Act provides for compensation to be paid to any permit holder whose permit is cancelled or curtailed because of a notified scheme coming into force.

The Road Transport Corporations Act, 1950, provides for the setting up of such Road Transport Corporations by each state government. The Act lays down the procedures for the management of the corporation and prescribes the duties and functions of its functionaries. It has been provided, under Section 18 of the Act, that the duty of the corporation shall be to provide or secure or promote the provision of an efficient, adequate, economical, and properly coordinated system of road transport services in the state.

A detailed description of the institutional and regulatory structure and legislative environment for the public transport sector in India is presented in Annexes B and C.

'hysical Performance of Thane Municipal Transport Undertaking

TMTU currently operates 264 buses[a] and has 2531 employees. The staff-to-bus ratio of 9.60 is high compared to the nationwide average of 7.26 in 2001 (ASRTU 2001). Bus operations are carried out from two depots, namely Kalwa and Wagle. Thirty-eight routes account for nearly 6000 daily trips.

The TMTU's operational characteristics display a steady trend. Fleet utilization (Figure 2.2) has been consistently between 80% and 95%, while kilometer utilization (Figure 2.3) has also been steady around 185 km per bus per day. It may be noted here that while fleet utilization by TMTU is close to the national average (Figure 2.2), kilometer utilization is significantly below the national average (Figure 2.3).

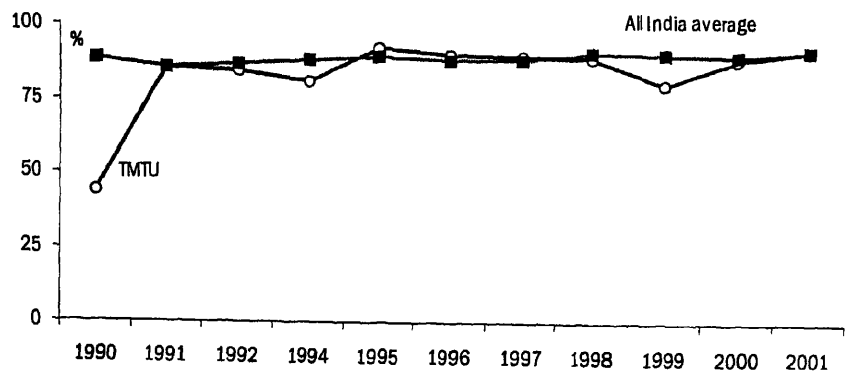


Figure 2.2 Fleet Utilization (%) of Thane Municipal Transport Undertaking
Source. ASRTU 2000 and 2001

[a] As mentioned earlier, this does not include four buses that have been converted to provide mobile repair and maintenance facilities.

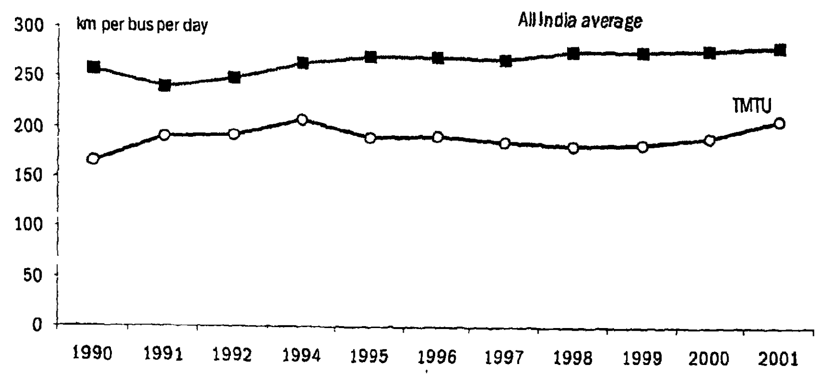


Figure 2.3 Kilometer Utilization (km per bus per day) of Thane Municipal Transport Undertaking
Source. ASRTU 2000 and 2001

Financial Performance of Thane Municipal Transport Undertaking

The TMTU's total expenditure has increased over 27 times since its inception, while revenue increased 24 times. This divergence in the growth rates is recent as is evident from Figure 2.4. In fact, for six of the previous 12 financial years, the TMTU has generated a surplus.

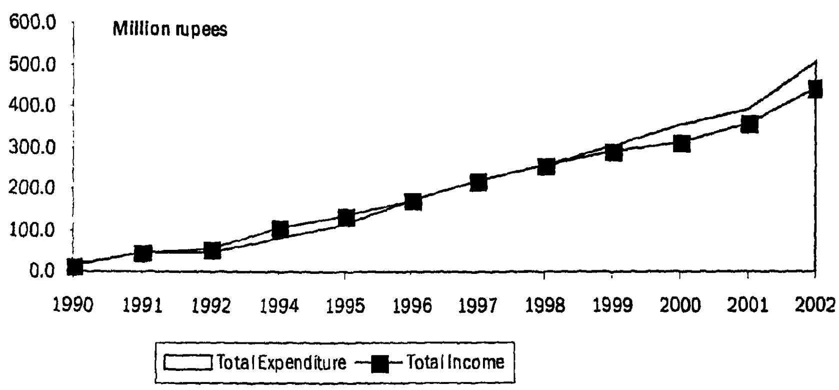


Figure 2.4 Thane Municipal Transport Undertaking's Financial Performance (million rupees)
Source. ASRTU 2000 and 2001

However, during the last 5 years, the TMTU has been incurring losses that have offset the surplus accrued in the preceding years. This is in part attributable to the increasing average age of buses (Table 2.2) that implies higher operations and maintenance expenditures.

Table 2.2 Age Profile of Thane Municipal Transport Undertaking Buses

Year	Number	Proportion
1988-89	28	10.45%
1989-90	40	14.93%
1990-91	0	0.00%
1991-92	12	4.48%
1992-93	30	11.19%
1993-94	38	14.18%
1994-95	35	13.06%
1995-96	0	0.00%
1996-97	35	13.06%
1997-98	0	0.00%
1998-99	30	11.19%
1999-00	0	0.00%
2000-01	20	7.46%
2001-02	0	0.00%
2002-03	0	0.00%
Grand Total	268	100.00%

The increasing trend of variable costs, particularly increased expenditure on diesel (Figure 2.5), also indicates a deterioration in the operational performance of buses. The other significant reason is the rise in fuel costs without a commensurate increase in fares. The last fare revision was effected by the TMTU in 1994. Since then, diesel prices have increased over 350%, from Rs. 7.00 per liter compared to Rs. 24.72 per liter currently.[a]

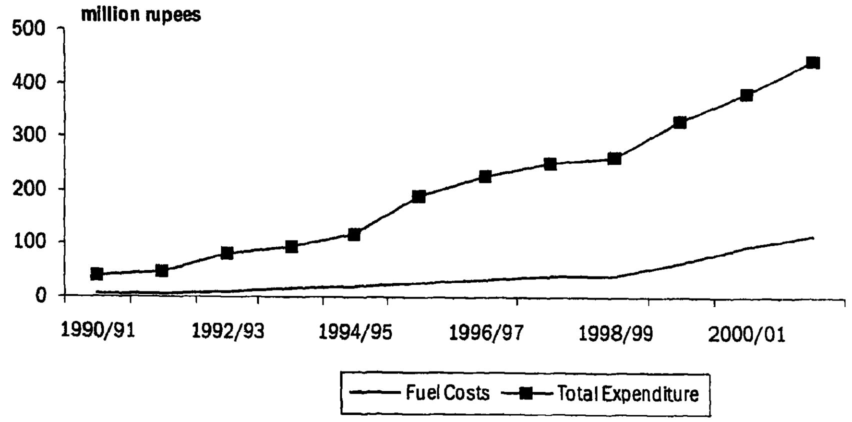


Figure 2.5 Thane Municipal Transport Undertaking's Variable Cost Trends

Source. TMTU Annual Budgets

[a] TMTU effected a fare hike of 25% to 60% depending on distance in January 2003. The results on revenue from this are yet to be documented.

Nevertheless, the potential for improvement in operational performance with a consequent reduction in losses is significant. On average, TMTU loses revenue because its buses do not travel over 9500 kilometers per day that are part of the normal schedule. Reasons for these lost kilometers are staff absenteeism (29%) and trip changes (20%) because of poor fleet schedule management. The breakdown rate, which account for 14.3% of the total lost kilometers, is also high, averaging nearly 22 buses per day. A detailed comparison of the TMTU's existing performance benchmarked against efficient operations values is presented in Chapter 4, which gives an indication of the possible scope for improvement.

Conclusions

A review of the delivery of public transport services in Thane reveals that there is considerable scope for improvement. In Thane, the physical and financial performance of the public transport operator has begun to deteriorate over the years. This has had implications for the share of public transport in meeting the city's travel demand.

Because of the recent continuing losses, the TMTU has been unable to generate adequate funds for capital expenses or replacement of rolling stock. The consequent financial crunch has severely limited the TMTU's ability to provide efficient public transit services in Thane. This has been compounded by the growing inability of the TMC to provide grants, leading to a vicious circle of continuous losses, leading to inadequate funds for capital expenses and poor fleet management of the fleet, which, in turn, leads to poor operational performance, causing even higher losses. The past practice of the TMC financing fleet augmentation from capital grants is unlikely to continue. Since the TMC cannot perpetually subsidize the TMTU's operations, there is need to review the status of operations to identify areas for reform.

An indication of the severity of the situation is that the TMTU is planning to scrap the first batch of buses purchased in 1988 and augment the fleet by buying an additional 100 buses, an investment of about 110 million rupees. This is by far the largest ever capital expenditure incurred by the TMTU in its existence. Quite obviously, it will be difficult for such a loss-making venture to leverage funds. Hence, it is necessary for the TMTU to improve its efficiency and rationalize its operations to be able to continue serving the public transport needs of Thane.

3 Subsidies in Public Transport Provisioning

A subsidy is traditionally regarded as 'a grant by a government to a private person or company to assist an enterprise deemed advantageous to the public'.[a] In economics, however, subsidies also include policies that create transfers through the market mechanism. This implies that tax concessions and government guarantees that allow industries to lower costs would also qualify as subsidies. An extension of this concept is to commodities and services that are not traded in the market, such as environmental goods. Here, the cost of a good or service does not include costs such as environmental damage, that is non-internalization of external costs. In that case, subsidies are the externalization of costs. An even broader perspective on subsidies is to include alternative economic opportunities that have been foregone. This view comprises a broader, economic approach towards defining a subsidy. For the purpose of this report, subsidies are defined as comprising all measures that keep prices for consumers below market level, or keep prices for producers above market level, or that reduce costs for consumers and producers by giving direct or indirect support.

The most common kinds of subsidy include the following:

- Government revenue foregone such as tax and duty exemptions or remissions. In the case of exemptions, although the companies involved do not actually receive any new money, they save on taxes or duties that they would otherwise have had to pay.
- Direct transfer of funds such as grants, loans, equity infusion, and rebates. In these cases, companies obtain cash from the Government, which they either do not have to repay (grant, rebate) or are charged interest at below the normal commercial rate (loans). It should be noted that the provision of equity capital does not confer a subsidy unless the investment decision is inconsistent with the normal practice of private investors, that is, the investment decision is made even where the expected return on equity is low.

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[a] Merriam-Webster Online Dictionary copyright © 2002 by Merriam-Webster, Incorporated, www.Merriam-Webster.com.

- Potential transfer of funds such as loan guarantees. These do not confer a subsidy unless the amount paid on a Government-guaranteed loan is less than the amount paid on a comparable commercial loan.
- Government provision of goods or services at preferential prices, or government purchases at excessive prices. It should be noted that the provision of goods or services by public utilities to companies does not normally confer a subsidy unless it can be shown that they are provided on terms, which do not allow for adequate remuneration at market levels.

Scope of Subsidy Calculations

This report reviews the subsidy policies towards the Thane Municipal Transport Undertaking and their quantitative implications. The following is the scope of subsidies taken for this project:

- The estimates of subsidies arrived at in this chapter are much broader than cash simply being transferred from the government to subsidy recipient as the estimates in this report also include the economic costs of foregone alternative opportunities. Consequently, removing an 'X' amount of subsidies does not necessarily imply an equal amount of cash generated for the public budget, but reflects the quantity of resources that may become available for the economy.
- Subsidy estimates in this report do not include any externalities, whether they are environmental costs, health costs, or opportunity costs of time due to loss in productive person-hours. This is being done for both fundamental and practical reasons. A fundamental difference is that subsidies in our definition arise from active government interventions, while externalities generally arise from the lack of government policy. Furthermore, there are considerable methodological difficulties in measuring subsidies and external costs, in particular concerning their reliability.

Methodology for Determining Subsidy

The TMTU (Thane Municipal Transport Undertaking) seeks annual grants from the TMC (Thane Municipal Corporation) to cover the shortfall in revenue. This deficit involves an actual transfer of funds from the TMC to the TMTU. This transfer does not include revenue forgone by the TMC in making these funds available to the TMTU. Hence, this does not correspond to the comprehensive definition of subsidies discussed above.

This section describes the process of estimating all subsidies in the service provisioning in the TMTU, including the opportunity cost of capital. These subsidies have been estimated for the period 1998/99 to 2002/03.

Determination of actual annual subsidy involves four stages:

Stage 1: Reorganization of cost and revenue streams, including a detailed description of each accounting head

Stage 2: Estimation of cost streams

Stage 3: Estimation of revenue streams

Stage 4: Estimating the subsidy.

Stage 1: Reorganization of Cost and Revenue Streams

Information on costs incurred and revenues obtained by the TMTU are available from the Annual Budget and the Profit and Loss Account. Some information is also available from monthly statistical statements, but there are inconsistencies in the heads under which expenditures and revenues are booked among these sources. For instance, two heads in the Profit and Loss Account of the TMTU, Overtime and Casual Labour, under which a total of Rs. 41.85 million has been booked in 2001/02, are not indicated explicitly in the Annual Budget. Similarly, heads such as Major Bus Body Repairs and Stipends are mentioned only in the Annual Budget and not in the Profit and Loss Account.

A reorganization of the accounts would ensure that heads are not duplicated and there is clarity in determining cost and revenue streams. To the extent possible, data has been obtained from the Profit and Loss Accounts for the previous years, that is, for the period 1998/99 to 2001/02. As these accounts are based on actual expenditure and have been audited by an independent chartered accountant, the subsidy estimates would be accurate. In addition, a department-wise classification would allow performance benchmarking to identify areas for improvement. For the current year, 2002/03, the estimates are based on the Monthly Expenditure and Revenue Statements for the first eleven months of the financial year that are available, extrapolated for the remaining month. Where an accounting head is not documented in the Monthly Expenditure Statement, the amount stated for 2002/03 in the Proposed Budget for 2003/04 has been taken. The reorganized budget has been broadly divided into cost and revenue streams.

Cost Streams

The cost streams have been divided into three heads:

- Capital Costs

- Annual Revenue Costs
- Taxes and other Liabilities.

Capital Costs include Annualized Capital Costs and Depreciation. A review of the Balance Sheet of the TMTU reveals that there are nine items considered as capital expenditure. As indicated in Table 3.1, out of the total capital expenditure since 1988/89, 96% has been undertaken for buying new buses, and land and buildings.[a] Ignoring items other than buses, and land and buildings, would not significantly affect the final estimates while considering these would imply significant additional effort. Hence, for assessing the Annualized Capital Costs, only these two heads were considered. The remainder has been considered part of the Annual Revenue Costs.

Table 3.1 Capital Expenditure by the Thane Municipal Transport Undertaking since 1988/89 (million rupees)

Year	Bus	Land & Construction	Vehicles	Typewriters, etc	Machinery	Furniture	Tools	Bags, Punches	Security Goods
1988-89	12.74	0.35	0.63	0.01	0.22	1.06	0.07	0.02	0.02
1989-90	23.58	0.11	0.83	0.01	0.03	0.43	0.00	0.16	0.01
1990-91	0.00	1.55	0.00	0.03	0.03	0.10	0.03	0.02	0.00
1991-92	7.66	0.18	0.00	0.00	0.00	0.02	0.00	0.06	0.00
1992-93	17.62	8.86	0.32	0.01	0.07	0.02	0.08	0.03	0.00
1993-94	8.00	12.09	0.00	0.06	0.14	0.24	0.03	0.01	0.00
1994-95	51.93	8.48	0.00	0.07	0.03	0.04	0.05	0.20	0.00
1995-96	41.23	14.87	0.00	0.04	0.04	0.09	0.04	0.15	0.00
1996-97	0.00	31.96	0.35	0.06	0.55	0.69	0.01	0.16	0.00
1997-98	0.00	37.75	0.00	0.03	0.11	0.12	0.00	0.11	0.06
1998-99	15.79	5.44	0.30	0.06	1.48	0.10	0.02	0.24	0.00
1999-2000	0.00	5.59	0.00	0.04	1.00	0.10	0.18	0.02	0.07
2000-01	13.92	2.27	0.00	0.30	0.55	0.07	0.07	0.02	0.00
2001-02	9.11	6.36	0.02	0.01	1.27	0.26	0.04	0.04	0.00
	57.35%	38.65%	0.70%	0.21%	1.57%	0.95%	0.18%	0.35%	0.05%

Annual Revenue Costs include Annual Fixed Costs, Semi-Variable Costs and Variable Costs of each department. The first includes all capital expenditure detailed in the Balance Sheet other than buses, and land and buildings. Semi-Variable Costs includes all items related to employee compensation, and other items that do not depend on the volume of service provided, such as expenditure

[a] All land assets have been provided to the TMTU by the TMC or the state government free of cost. Hence, all expenditure under this head is only on account of buildings and construction.

towards permits and interviews. Variable Costs have been detailed out for each department, Administration, Workshop, and Traffic. These include all cost items that depend on services such as Telephone Bills for Administration, Batteries and Spare Parts for Workshop, and Fuels and Lubricants for Traffic.

Taxes and other Liabilities include items such as Taxes and Insurance. A detailed estimation of cost streams is done in Stage 2.

Revenue Streams

Revenue Streams have been divided into two heads, Traffic Earnings and Non-Traffic Earnings. The former, as the name suggests, includes all revenue streams that are dependent on the number of commuters carried, such as tickets and passes. The latter includes revenue items such as those from advertisements that do not depend directly on the number of commuters carried. A detailed estimation of revenue streams is carried out in Stage 3.

Figure 3.1 describes the components of the revenue and cost streams used for estimating the subsidy.

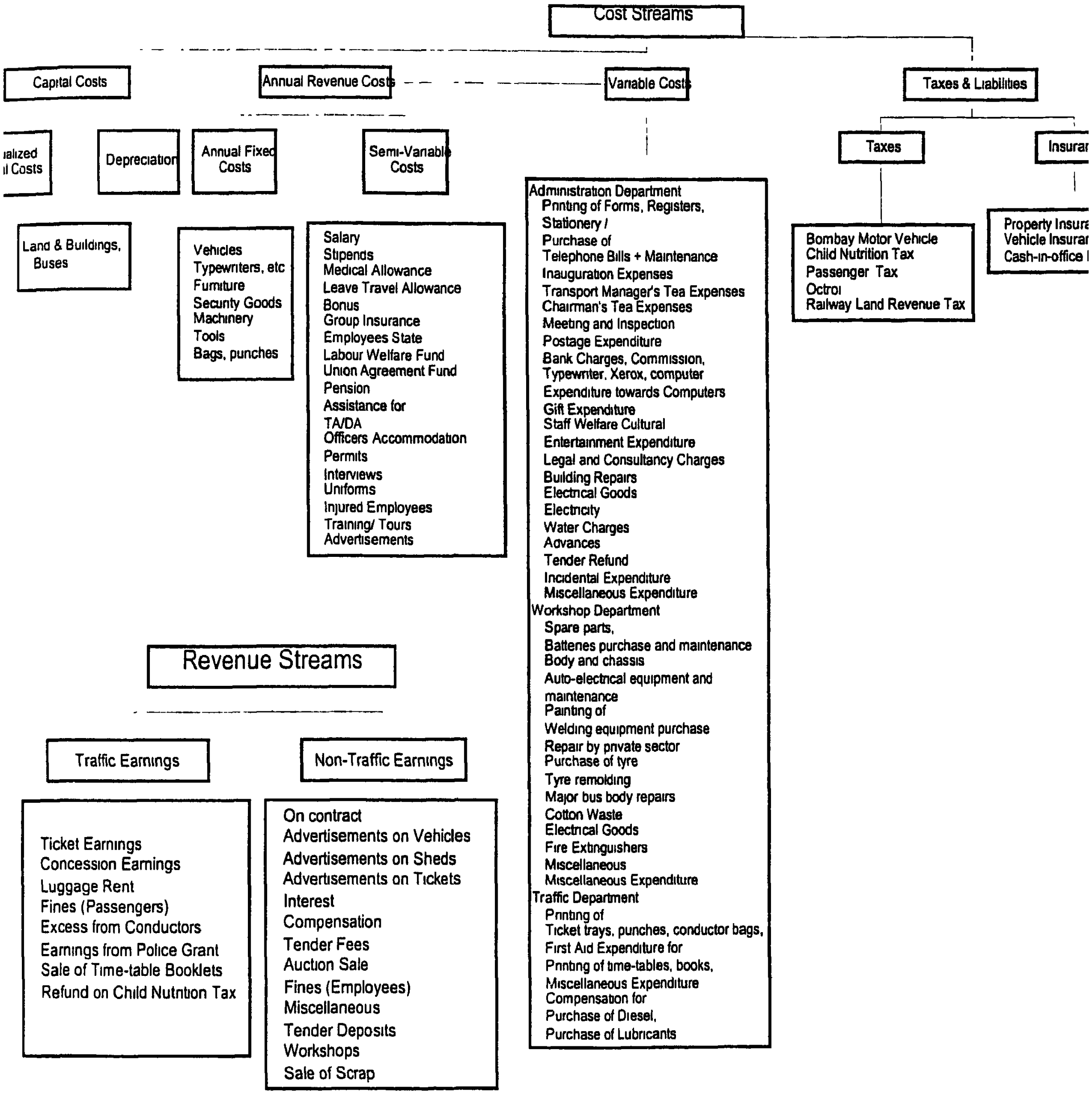


Figure 3.1 Cost and Revenue Streams for Estimating the Annual Subsidy

Stage 2: Estimation of Cost Streams

As indicated in Figure 3.1, the cost streams have been classified into three heads, capital investments annualized to the current financial year, costs specific to the current financial year, and taxes and insurance. Hence, the Total Annual Cost (TAC) incurred by the TMTU in a year can be described as follows:

$$3.1..... \quad TAC = [CC + ARC + TL]$$

Where,

- CC is the cost due to assets purchased before the current financial year
- ARC is the annual revenue costs during the current financial year
- TL is the expenditure because of taxes and insurance during the current financial year

Capital Cost

Capital costs include ACC (Annualized Capital Costs) and depreciation costs. ACC is defined as the capital cost of an asset recovered annually over the life of the asset. As buses and land assets have contributed over 95% of the total capital expenditure by TMTU since its inception in 1988/89, only these cost streams have been annualized. [a]

For annualizing capital expenditure on buses and land assets, each year's capital expenditure on these assets has been multiplied by the corresponding CRF (Capital Recovery Factor). The capital recovery factor is based on two variables – the rate of interest and the period. A review of resource mobilization by the TMTU for purchasing buses reveals that they have obtained loans only on four occasions; the buses were purchased mainly by grants from the TMC. To estimate the opportunity cost of these grants, they were treated as commercial loans. The four loans that have been obtained by the TMTU are at rates comparable with the PLR (Prime Lending Rates) for that financial year (Table 3.2). [b] On the other hand, a comparison with Coupon Rates on Government Securities issued in the same years of tenure similar to that of the loan reveals a marginally larger variance.[c]

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[a] ACC for land and buildings would have two components, ACC for buildings and the rental on land. The rental value of the property would be the correct assessment of the annual contribution of capital assets under Land and Buildings. Attempts were made to obtain the Annual Rateable Value of the properties owned by the TMTU as an approximation of the rental value. However, this information has not been made available. Consequently, the Annualized Capital Cost due to Land and Buildings has been estimated based on the total capital expenditure under this head since 1988/89, hence largely reflecting capital expenditure on construction.

[b] Variance of 0.027.

[c] Variance of 0.079.

Table 3.2 Resource Mobilization by Thane Municipal Transport Undertaking for Purchasing Buses

Year	Interest Rate	Term (Years)	PLR	Coupon Rate on Similar Term G-sec
1989-90	14.92%	5	14.00%	N A[a]
1993-94	13.00%	5	16.00%	13.70%
1996-97	15.00%	6	16.75%	11.83%
1998-99	12.00%	7	13.00%	14.00%

The other issue is the life of the assets. As the life of buses, and land and buildings, is significantly longer than the term of loans, estimating the annualized capital costs with the interest rates for loans with lower tenures would lead to overestimation of the capital costs. To address this concern, coupon rates on government securities for 15 years have been used to estimate the CRFs. These have been adjusted to reflect the risk premium on the TMTU by adding the average difference between the interest rates on the four loans taken by TMTU and the coupon rates on the corresponding term government securities. The corrected interest rates used for estimating the CRFs for annualizing capital costs are given in Table 3.3.

Table 3.3 Interest Rates Used for Calculating CRFs

Year	Coupon Rate on 15 Year G-sec	Corrected Interest Rate used to Calculate CRF
1988-89	12.59%	12.75%
1989-90	14.00%	14.16%
1990-91	14.00%	14.16%
1991-92	13.65%	13.81%
1992-93	12.25%	12.41%
1993-94	11.99%	12.15%
1994-95	12.29%	12.45%
1995-96	12.32%	12.48%
1996-97	11.03%	11.19%
1997-98	12.40%	12.56%
1998-99	11.83%	11.99%
1999-00	11.50%	11.66%
2000-01	12.30%	12.46%
2001-02	8.07%	8.23%

The CRF has then been calculated as follows:

[a] No five year Government Securities were issued in 1989/90

3.2..... $CRF = (r*(1+r)^n)/((1+r)^n-1)$

Where,

- r is the corrected interest rate
- n is the number of years.

For estimating the CRF, n has been taken to be 15 years for buses, while 30 years has been assumed for land and buildings. To arrive at the annualized capital cost, capital cost incurred on buses, and land and buildings for each year is multiplied by the corresponding CRF.

3.3..... Annualized Capital Cost = CRF * Capital Cost

Depreciation Cost

The use of an asset over time leads to a reduction in its productivity at the margin. This is captured using the depreciation rate for capital assets.

Profit and Loss Accounts often use statutorily defined depreciation rates for various types of assets. Moreover, governments often allow accelerated depreciation of particular assets to promote faster capital accumulation. This policy would qualify as a subsidy when viewed in the context of subsidy definition provided in the introduction to this chapter. In addition, a change in government policy on permissible depreciation rates would entail a change in the provision for depreciation in Profit and Loss Accounts, without there being a change in the productivity of the asset. Hence, for the purpose of this analysis, a depreciation rate is determined such that it recovers the full capital cost over the life of the asset. Since the only two assets considered for this analysis are buses, and land and buildings, a provision for depreciation has been made only for these two assets.

3.4..... Depreciation cost = 1/Life of asset

Capital Costs estimated using the methodology described above are given in Table 3.4.

Table 3.4 Annualized Capital Costs and Depreciation for Thane Municipal Transport Undertaking (million rupees)

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Annualized Capital Costs					
Land and Buildings	16.79	16.21	15.92	15.25	14.57
Buses	27.71	27.71	27.71	25.19	25.19
Depreciation					
Land and Buildings	4.53	4.32	4.24	4.05	3.87
Buses	13.44	12.83	11.90	11.90	10.85
Total	62.47	61.07	59.78	56.39	54.48

Annual Revenue Costs

This component of the Total Annual Cost has been subdivided into three heads, Annual Fixed Costs, Semi-Variable Costs, and Variable Costs. The first head includes all expenditure other than buses, and land and buildings, listed under Capital Assets in the Balance Sheet of the TMTU. These are detailed in Table 3.5.

Table 3.5 Annual Fixed Costs of Thane Municipal Transport Undertaking (thousand rupees)

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Purchase of vehicles	800.00	19.90	0.00	0.00	302.19
Purchase of typewriters, Xerox machines	500.00	10.32	303.80	35.94	64.97
Furniture	400.00	256.23	66.42	102.60	99.46
Security goods	100.00	0.00	3.80	67.13	0.00
Machinery	900.00	1267.28	549.10	1,004.02	1,484.29
Mechanical and general tools	100.00	35.23	67.27	181.32	23.97
Bags, punches	0.00	36.42	24.40	17.50	239.08
Total	2800.00	1625.37	1014.79	1408.52	2213.97

Cost items under Semi-Variable Costs include all expenditures due to employee compensation and other non-variable annual costs (Table 3.6).

Table 3.6 Semi-Variable Costs of Thane Municipal Transport Undertaking (thousand rupees)

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Salary (Administration Department)	7,663.97	8,154.28	5,248.70	4,704.90	3,595.54
Salary (Workshop Department)	31,630.41	32,613.36	29,501.68	23,204.44	18,047.57
Salary (Traffic Department)	146,259.86	132,188.17	112,118.69	97,185.72	75,944.65
Stipends	650.25	0.00	0.00	0.00	0.00
Medical allowance	2,644.00	4,150.21	1,324.50	8.55	13.50
Leave travel allowance	1,078.35	1,017.00	1,157.25	826.61	725.55
Bonus	15,304.54	6,212.40	5,201.26	16,172.81	12,119.05
Group insurance	395.00	320.00	322.46	0.00	0.00
Employees state insurance	0.00	0.00	0.24	555.30	5,055.29
Labour welfare fund	180.00	43.30	43.77	43.87	40.40
Union agreement fund	0.00	0.00	0.00	0.00	0.00
Pension	2,374.27	1,121.27	443.56	402.36	1,191.28
Assistance for housing	100.00	0.00	0.00	0.00	0.00
Travel allowance/Dearness allowance	18.86	10.60	11.93	10.43	20.39
Officers accommodation rent	72.00	0.00	0.00	0.00	15.20
Expenditure towards permits	45.00	109.20	27.35	49.10	15.39
Expenditure towards interviews	22.50	0.77	2.00	0.00	1.24
Uniforms	2,600.00	1,187.47	338.50	1,243.22	1,942.86
Expenditure on injured employees	100.00	19.36	40.38	6.24	11.29
Training/Tours	200.00	463.86	380.27	437.81	293.61
Advertisement for recruitment, tenders, etc.	218.39	357.34	741.27	350.40	234.65
Total	211,557.41	187,968.58	156,903.78	145,201.75	119,267.46

Cost items under Variable Costs are listed in Table 3.7.

Table 3.7 Variable Costs of Thane Municipal Transport Undertaking (thousand rupees)

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Variable Costs - Administration Department					
Printing of Forms, Registers, etc.	934.07	770.35	592.15	577.18	246.61
Stationery/Xerox	600.00	467.45	297.56	291.12	508.48
Purchase of books	0.49	5.68	1.47	2.20	1.67
Telephone bills + maintenance	766.23	671.75	581.83	554.15	260.44
Inauguration expenses	102.82	173.22	281.25	256.06	104.49
Transport Manager's tea expenses	25.00	22.66	24.03	12.36	15.97
Chairman's tea expenses	60.00	159.35	92.37	76.20	57.73
Meeting and inspection expenses	87.78	127.17	28.84	44.88	0.40
Postage expenditure	40.95	17.00	17.08	12.89	11.09
Bank charges, commission, etc.	28.66	65.11	289.86	111.19	192.73
Typewnter, Xerox, computer maintenance	50.00	54.02	115.90	116.83	56.60
Expenditure towards computers	400.00	442.45	410.88	321.74	376.11

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Gift expenditure	10.00	0.00	0.00	0.00	0.00
Staff welfare cultural expenses	550.86	33.81	38.39	2.50	12.55
Entertainment expenditure	0.00	5.67	9.04	13.68	4.74
Legal and consultancy charges	174.17	774.04	468.64	280.56	125.00
Building repairs	3.286.91	1,812.61	1,547.68	1,295.54	1,158.56
Electrical goods	100.00	0.00	0.00	0.00	0.00
Electricity charges	2,928.59	1,967.69	1,358.10	1,005.81	471.40
Water charges	100.00	352.23	28.80	35.68	24.57
Advances	5,900.00	4,245.38	17,764.56	5,353.76	7,147.57
Tender refund	0.00	0.00	0.00	1,231.52	47.60
Incidental expenditure	100.00	46.16	93.93	0.00	14.23
Miscellaneous expenditure	27.61	27.43	28.52	16.08	23.20
Sub total	16,274.14	12,241.24	24,070.86	11,611.91	10,861.72
Variable Costs - Workshop Department					
Spare parts, etc.	29,765.46	18,390.17	15,025.99	14,779.98	14,998.19
Batteries purchase and maintenance	888.00	740.55	655.43	1,274.10	1,466.45
Body and chassis maintenance	2,179.00	1,992.13	2,139.88	1,913.14	2,218.00
Auto-electrical equipment and maintenance	1,934.00	1,359.50	1,169.50	1,186.05	2,218.00
Painting of vehicles	210.00	164.25	361.48	267.26	181.46
Welding equipment purchase	236.00	123.67	142.38	140.80	73.17
Repair by private sector	3,439.00	2,825.00	2,097.01	2,381.61	1,507.35
Purchase of tyre tubes	6,819.29	7,560.49	6,971.45	4,788.52	6,764.54
Tyre remoulding	3,645.69	3,815.02	5,583.79	4,844.83	4,359.86
Major bus body repairs	300.00	1,469.32	168.25	139.37	714.42
Cotton Waste	373.00	286.97	284.28	361.66	456.47
Electrical Goods	97.53	215.60	253.04	88.87	50.10
Fire Extinguishers	15.00	0.00	0.00	0.00	0.00
Miscellaneous tools	20.00	12.51	8.78	4.15	0.50
Miscellaneous Expenditure	235.94	58.44	58.10	51.83	49.92
Sub total	50,157.91	39,013.61	34,919.35	32,222.19	35,058.42
Variable Costs - Traffic Department					
Printing of Tickets	1,818.17	1,305.27	1,415.98	1,501.79	1,832.02
Ticket trays, punches, conductor bags, etc.	105.00	36.42	24.40	26.05	239.08
First Aid Expenditure for passengers	57.01	9.78	5.00	11.50	6.03
Printing of time-tables, books, etc	1.00	0.00	0.00	0.00	0.00
Miscellaneous Expenditure	4.78	4.55	14.61	11.26	8.31
Compensation for Accidents	500.00	400.00	0.00	0.00	0.00
Purchase of Diesel, Fuel	136,052.79	113,459.88	94,492.73	63,496.71	40,462.92
Purchase of Lubricants	3,381.48	4,006.25	4,739.03	4,015.11	4,396.62
Sub total	141,920.24	119,222.15	100,691.75	69,062.41	46,944.98
Total	208,352.29	170,476.99	159,681.97	112,896.51	92,865.13

Taxes and Other Liabilities

The various tax and insurance liabilities of the TMTU are listed under this head (Table 3.8).

Table 3.8 Taxes and Other Liabilities of Thane Municipal Transport Undertaking (thousand rupees)

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Taxes					
Bombay Motor Vehicle Tax	1,636.36	1,217.28	1,165.32	1,070.40	1,033.77
Child Nutrition Tax	13,325.42	12,542.88	11,421.69	11,895.82	11,771.33
Passenger Tax	15,363.17	14,125.01	11,920.61	10,061.13	8,830.19
Octroi	7,690.91	7,241.34	8,176.77	4,970.98	3,913.43
Railway Land Revenue Tax	125.00	0.00	103.86	94.42	253.73
Insurance					
Property Insurance	455.00	2,932.29	2,594.51	3,709.50	3,056.75
Vehicle Insurance	1,000.00	0.00	0.00	0.00	0.00
Cash-in-office Insurance	16.00	0.00	0.00	0.00	0.00
Total	39,611.86	38,058.80	35,382.76	31,802.24	28,859.19

:age 3: Estimation of Revenue Streams

Annual revenue has been classified under two heads, namely Traffic Earnings and Non-Traffic Earnings. The Total Annual Revenue (TAR) generated by the TMTU in the financial year 2002/03 is estimated as follows:

$$TAR = NTE + TE \quad 3.5.....$$

Where,

- NTE are the total Non-Traffic Earnings in the current financial year
- TE are the total Traffic Earnings.

Non–Traffic Earnings, such as advertisements on vehicles and sheds, do not have any direct correlation with the performance of vehicles in terms of kilometers traveled. Traffic Earnings, also referred to as operational revenue, have two components, earnings through sale of tickets and passes (referred to as concession earnings) (Table 3.9).

Table 3.9 Revenue Streams of Thane Municipal Transport Undertaking (thousand rupees)

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Traffic earnings					
Ticket earnings	420,692.24	406,728.82	343,970.20	292,796.61	258,962.68
Concession earnings	12,570.70	8,989.42	8,484.41	6,727.17	5,146.45
Luggage rent	1.00	0.00	0.00	0.00	0.00
Fines (passengers)	375.87	283.21	506.35	296.82	314.02
Excess from conductors	28.79	0.00	0.00	0.96	0.60
Earnings from police grant	8,775.00	5,855.51	5,749.60	3,487.45	3,064.24
Sale of Time-table booklets	1.00	0.00	0.00	0.00	0.00
Refund on Child Nutrition Tax	333.14	559.01	109.06	228.41	447.73
Non-traffic earnings					
On contract	1.00	0.00	0.00	0.00	0.00
Advertisements on vehicles	2,200.00	2,411.57	1,960.21	1,348.48	1,796.75
Advertisements on sheds	255.00	0.00	0.00	0.00	0.00
Advertisements on tickets	1.00	0.00	0.00	0.00	0.00
Interest	1.00	0.03	0.08	0.47	1.18
Compensation	355.00	36.21	33.05	16.42	36.64
Tender fees	75.00	267.82	64.10	60.23	28.00
Auction sale	5.00	0.00	0.00	0.00	0.00
Fines (employees)	38.15	109.56	76.26	93.33	87.54
Miscellaneous	225.00	502.72	252.46	207.48	362.96
Tender deposits	650.00	5,726.49	3,848.96	3,897.69	5,208.79
Workshops					
Sale of scrap	1,500.00	2,072.35	1.30	0.00	514.73
Total	448,083.88	433,542.70	365,056.02	309,161.52	275,972.30

Stage 4: Estimating the Subsidy

The total subsidy that is being borne by the TMTU is the difference between the annual costs and revenues, that is:

3.6..... Total Subsidy = TAC - TAR

Annex D provides the detailed sequence of the cost and revenue streams and the subsidy calculation therein. A detailed description of each head of the budget has been given along with the amount. A summary of the results is presented in Table 3.10.

Table 3.10 Annual Subsidies of Thane Municipal Transport Undertaking (million rupees)

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Total Annual Costs	524.79	459.20	412.76	347.70	297.69
Capital Costs	62.47	61.07	59.78	56.39	54.48
Annual Revenue Costs	422.71	360.07	317.60	259.51	214.35
Taxes and other Liabilities	39.61	38.06	35.38	31.80	28.86
Total Annual Revenue	448.08	433.54	365.06	309.16	275.97
Traffic Earnings	442.78	422.42	358.82	303.54	267.94
Non-Traffic Earnings	5.31	11.13	6.24	5.62	8.04
Subsidy	76.70	25.66	47.70	38.54	21.71

The total annual cost incurred by the TMTU for the financial year 2002/03 has been calculated to be approximately 525 million rupees. The maximum expenditure is incurred under the head of Annual Costs, amounting to over 422 million rupees. The total annual revenue generated by the TMTU during 2002/03 is about Rs. 448 million. Most of this revenue has been generated through the sale of tickets and concession passes, collectively referred to as Traffic Earnings, while Non-Traffic Earnings accounted for Rs. 5.31 million.

Consequently, the deficit or the subsidy for public transport services in 2002/03 is Rs. 76.70 million.

ommercial Accounting for Thane Municipal Transport ndertaking

The subsidy estimated in this chapter is not the amount that needs to be transferred from the TMC to the TMTU. This transfer of funds would be based on the gap between the revenue generated and costs incurred by the TMTU. The difference between the two estimates arises from the treatment of capital in economics principles and accounting practices. The opportunity cost of capital remains the same across all uses of capital and this principle has been applied in estimating the Annualized Capital Costs. In accounting, however, the rate of interest on debt and the return on capital may vary depending on the company and the sector. For instance, in the power sector, the rate of return on equity for the private electricity distribution company in Delhi is statutorily pegged at 16%. However, for the State Electricity Boards, the statutory return on net assets is 3%. The premise of providing a statutory return on equity or assets is that this will help in maintaining and expanding services as most of these public infrastructure services are provided without a commercial orientation. In addition, provision for depreciation in Profit and Loss Accounts could be based

on special provisions for specific types of assets. Annual Revenue Costs, Taxes and Other Liabilities, and the Revenue Streams are largely similar in both analyses.

To obtain the amount of budgetary support that the TMC should provide to the TMTU, commercial accounting is necessary. As mentioned earlier, the TMTU does maintain an audited Profit and Loss Account and a Balance Sheet. These indicate the budgetary support necessary for the TMTU to operate. One drawback in the existing accounting system in the TMTU is that there is no provision for either return on equity or return on net assets. Moreover, since these operations are loss making, an additional accounting head of this type would be only notional. Nevertheless, for illustration, Profit and Loss Accounts for the TMTU have been prepared for the period 1998/99 to 2002/03. Since actual expenditures for 2002/03 are not available for the entire year, the estimates here are based on monthly statements for the first eleven months of the year extrapolated for the remainder of the year.[a] For heads not indicated in the monthly statements, eight month actual expenditure as presented in the Annual Budget for the TMTU 2003/04 have been extrapolated to determine annual costs and revenues. A return of 12% on net assets has been assumed for this analysis.

The depreciation rate that is applied by the TMTU on its assets is indicated in Table 3.11. The monthly depreciation amount for all assets has been indicated in the monthly statements. As earlier, the annual expenditure has been calculated based on the 11 month actual expenditure stated in the monthly statement. The total estimated depreciation provision estimated in this manner is Rs. 33.7 million.

Table 3.11 Depreciation Parameters

Type of asset	Rates Charged	Life Assumed (years)	Method
Buses	22.5%	10	Reducing balance
Cars	15.0%	6-7	Straight line
Machinery and others	10.0%	10	Straight line

Hence, it is estimated that budgetary support of about 60 million rupees would be necessary for the TMTU in 2002/03 (Table 3.12). This can be compared with the subsidy in public transport provisioning in 2002/03 of almost 77 million rupees.

[a] It must be emphasized that this exercise is purely illustrative and does not attempt to raise reservations on the Profit and Loss Accounts of the TMTU.

Table 3.12 Illustrative Profit and Loss Accounts of Thane Municipal Transport Undertaking (thousand rupees)[a]

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Operating expenditure					
Semi - Variable costs	208,957.41	187,968.58	156,903.78	145,201.75	119,267.46
Variable costs	208,352.29	170,476.99	159,681.97	112,896.51	92,865.13
Taxes	38,140.86	35,126.51	32,788.25	28,092.75	25,802.45
Insurance	1,471.00	2,932.29	2,594.51	3,709.50	3,056.75
Depreciation					
Buses		13,007.24	11,086.76	13,944.84	227.88
Purchase of vehicles		111.32	110.17	110.47	162.22
Others assets		17,320.77	16,821.72	16,136.71	180.50
Sub Total	33,733.09	30,439.33	28,018.65	30,192.03	570.61
Non operating expenditure					
Return on new assets					
Purchase of vehicles	135.25	58.40	77.87	121 51	102.30
Purchase of typewriters, Xerox machines	95.54	113.31	131.08	148.86	166.63
Furniture	208.16	224.99	291.82	349.38	402.13
Security Goods	14.58	4.24	10.95	3.62	8.34
Land, Equipment, Depot construction	16,677.54	14,526.19	13,569.61	14,915.41	13,671 61
Machinery	196.45	154.97	207.12	227.04	66.92
Mechanical and general tools	21.97	20.57	32.62	15.49	15.31
Bags, Punches	58.45	86.23	111.48	136.73	126.96
Buses	14.58	4.24	10.95	3.62	8.34
Sub Total	17,422.54	15,193.14	14,443.51	15,921.67	14,568.55
Total	508,077.20	442,136.85	394,430.67	336,014.19	256,130.94
Traffic earnings	442,777.73	422,415.96	358,819.61	303,537.42	267,935.71
Non-Traffic earnings	5,306.15	11,126.74	6,236.41	5,624 09	8,036.58
Total	448,083.88	433,542.70	365,056.02	309,161.52	275,972.30
Profit (loss)	(59,993.31)	(8,594.15)	(29,374.65)	(26,852 67)	19,841.36

[a] Since most cost items are common to the subsidy estimation in Table 3.10 and the Profit and Loss Accounts, only the items that have been treated differently are listed in detail.

4 Cost Reductions from Efficiency Improvements

The methodology followed in Chapter 3 for determination of subsidy broadly involves assessing the breakdown of different cost and revenue streams. There is potential for reducing the gap between revenues and costs attributable to sub-optimal operations.

Inefficient operations would be reflected in terms of subsidies either as higher costs or lower revenues. Higher costs could arise from sub-optimal utilization of capital assets or from poor operations and maintenance. Revenue shortfall, again, could be due to either sub-optimal utilization of capital assets thus leading to lower service delivery, or leakages such as ticket-less travel. Since information on ticket-less travel is not available, this chapter estimates the potential reduction in losses that would arise from higher capacity utilization and lower operating costs. This would also help ascertain the directions for reforms to reduce the subsidy in public transport operations in Thane.

Benchmarking Strategy

To identify inefficiencies in operations, it is necessary to benchmark the physical performance of the TMTU. There can be three forms of benchmarking in the public sector:

- Corporate style benchmarking: The comparison can be done with the 'best in class'. Therefore, the benchmarks would have to be based on cities with the best delivery of these services, giving a target to achieve. Thus, a city might choose different benchmarks set by different cities for their set of indicators. For example, Thane might compare its performance on fuel consumption with Chennai and fleet utilization with Ahmedabad.
- Comparison of performance statistics as benchmarks: State Governments or Central Government agencies often set norms for operational performance. The performance of a city may be compared by comparing the performance statistics for previous years. In the transport sector, independent agencies such as the Association of State Road Transport Undertakings and the Central Institute of Road Transport often recommend such standards of operational efficiency.

- Benchmarks in 'visioning' initiatives: A local body may also decide to prescribed benchmarks different from the above two. A city might not be satisfied with the corporate style of benchmarking or set norms and standards. This could be because these norms are unrealistically high or do not truly reflect the city's needs. Officials could brainstorm amongst themselves and with sector experts to come up with practical and attainable benchmarks.

Thane has not undertaken such a benchmarking exercise in the past and hence no 'visioning style' benchmarks are available to assess its performance. In addition, there are no statutory benchmarks for public transport operations in India. Nevertheless, as mentioned earlier, there are nationally and internationally accepted values for several important performance indicators such as fleet utilization and load factor.

The benchmarking exercise in this chapter is based on Corporate style benchmarking, that is, comparisons with similar urban transport undertakings in India, and an assessment of what is feasible for the TMTU in the medium term. The urban public transport undertakings short-listed for this purpose have been classified into two categories (Table 4.1). The first category includes corporations similar in size to the TMTU, that is, with less than 1000 buses. The second category includes all urban transport corporations in Maharashtra and Gujarat, and hence would reflect corporations working in a similar cultural, industrial, institutional, and legislative environment. The second category also includes all corporations operating under municipal legislations, that is municipal transport undertakings.

Table 4.1 Composition of Various Categories for Benchmarking Physical Performance

Less than 1000 buses	Maharashtra and Gujarat
Ahmedabad	Ahmedabad
Pune	Mumbai
Chandigarh	Pune
Pimpri	Pimpri
Thane	Thane
Sholapur	Sholapur
Kolhapur	Kolhapur

Choice of Parameters

As mentioned earlier, this chapter presents the potential for improving the TMTU's operational performance that would lead to lower costs and higher revenues. A higher capacity utilization should imply a higher number of effective kilometers by the TMTU buses and hence lower fixed cost per unit of travel. Similarly, a higher capacity utilization with a higher Load Factor should yield more passengers per kilometer and more kilometers, and hence a higher revenue. Improved fuel efficiency would lead to lower costs due to fuel consumption. Table 4.2 presents the performance of selected SRTUs (Table 4.1) on five parameters.

Table 4.2 Performance of Selected Public Transport Operators in 2001

Parameter	Km Utilization	Fleet Utilization	Occupancy Ratio	Employee Productivity	Fuel Efficiency
Description	Km per bus per day	Proportion of fleet on road	Proportion of seats occupied	Staff per bus	Km per liter
Ahmedabad	167.10	81%	74%	9.47	3.70
Chandigarh	306.30	95%	81%	5.86	4.00
Mumbai	194.90	92%	76%	12.00	3.04
Pune	197.70	82%	69%	10.29	3.42
Pimpri	193.90	61%	44%	14.13	3.83
Thane	**190.60**	**91%**	**67%**	**11.43**	**3.31**
Kolhapur	227.10	61%	56%	13.93	3.61

A summary of the performance of public transport undertakings in 2001 is presented in Table 4.3 as are comparisons with the TMTU's current performance. The TMTU's performance compares well with most similar public transport operators in India as is evident from comparisons with the average performance of other similar public transport operators. Nevertheless, there is potential for improvement. For instance, while the fleet utilization in the TMTU is comparable with other urban SRTUs in India, its performance on occupancy ratio and fuel efficiency can be improved. This conclusion is reinforced by comparisons with the best performers in each category. Nevertheless, it is necessary to temper the probable improvements with the current performance in the TMTU. Taking this consideration into account, the recommended benchmarks for the TMTU are also detailed in Table 4.3. Hence, it is recommended that the TMTU should improve its capital utilization significantly to 250 km per bus per day with at least 95% of its fleet on the road daily. In addition, at least 95% of its seating capacity should be used on average. Finally,

maintenance practices should be improved to obtain at least 4.5 kmpl (kilometers per liter) of diesel consumed. This target is similar to a 'visioning initiative' set by the TMTU for itself at 4.25 kmpl.

Table 4.3 Performance of Public Transport Operators in 2001 in Comparison with Thane Municipal Transport Undertaking

Parameter	TMTU	Average	Best performing	Recommended
Km utilization	190.60	198.63	306.30	250.00
Fleet utilization	91%	71%	95%	95%
Occupancy ratio	67%	59%	81%	95%
Fuel efficiency	3.31	3.23	4.00	4.50

Implications for Subsidies

To estimate the impact of improved efficiency on costs, the following methodology has been used. First, the sum of Capital Costs, Annual Fixed Costs, Semi-Variable Costs and the Variable Costs of Administration estimated in Chapter 3 have been divided by the number of kilometers traveled by the entire TMTU fleet in 2002/03 with the current operational efficiency compared to the improved operational efficiency. Next, the variable costs other than fuel costs, that is, costs dependent on the number of kilometers traveled, were identified. These were then normalized with the number of kilometers, to obtain the variable cost per kilometer. Finally, reduction in total fuel costs due to an improvement in the fuel efficiency has been estimated.

For revenue, Non-Traffic Revenue has been treated similar to fixed costs, that is, divided by the number of kilometers traveled by the entire TMTU fleet in 2002/03 with the current operational efficiency compared to the improved operational efficiency. To obtain the increase in revenue due to larger effective passenger kilometers, the current revenue per kilometer has been multiplied with the increased carrying capacity of the TMTU fleet.

Table 4.4 Implications of Improved Operational Performance on Public Transport Subsidies in Thane

	Current		Recommended	
	Rupees million	Rs per km	Rupees million	Rs per km
Costs				
Fixed costs				
Capital Costs	62.47	3.19	62.47	2.69
Annual Fixed Costs	2.80	0.14	2.80	0.12
Semi - Variable Costs	211.56	10.80	211.56	9.11
Variable Costs - Administration Department	16.27	0.83	16.27	0.70
Taxes and other Liabilities	39.61	2.02	39.61	1.71
Non-fuel variable costs				
Variable Costs - Workshop Department	50.16	2.56	59.49	2.56
Variable Costs - Traffic Department	5.87	0.30	6.96	0.30
Fuel costs	136.05	6.95	118.69	5.11
Total costs	524.79	26.79	517.84	22.29
Revenue				
Traffic Earnings	442.78	22.60	599.62	25.81
Non - Traffic Earnings	5.31	0.27	5.31	0.23
Total Revenue	448.08	22.87	604.93	26.04
Net	-76.70	-3.92	87.08	3.75

Hence, it is clear from Table 4.4 that the TMTU would be able to generate a substantial surplus even with the current fare structure if it were to improve its operational performance. The implications for the Profit and Loss Account are given in Table 4.5.

Table 4.5 Implications of Improved Operational Performance on Thane Municipal Transport Undertaking's Profit and Loss Account

	Current		Recommended	
	Rupees million	Rs per km	Rupees million	Rs per km
Costs				
Fixed costs				
Depreciation	33.73	1.72	33.73	1.45
Return on net assets	17.42	0.89	17.42	0.75
Semi -Variable Costs	208.96	10.67	208.96	8.99
Taxes	38.14	1.95	38.14	1.64
Insurance	1.47	0.08	1.47	0.06
Variable Costs				
Variable Costs – Administration department	16.27	0.83	19.30	0.83
Variable Costs - Workshop department	50.16	2.56	59.49	2.56
Variable Costs - Traffic department	141.92	7.24	125.65	5.41
Total costs	508.08	25.94	504.16	21.70
Revenue				
Traffic Earnings	442.78	22.60	599.62	25.81
Non -Traffic Earnings	5.31	0.27	5.31	0.23
Total Revenue	448.08	22.87	604.93	26.04
Net	-59.99	-3.06	100.77	4.34

Employee Productivity Issues

Employee compensation forms over 35% of the total costs in the TMTU and is by far its largest cost component. Within this, salaries in the traffic department, that is of drivers and conductors, comprise over 28%. Hence, improving employee productivity could be the single most important factor in reducing costs. A detailed analysis of employee costs and the potential for reduction would require an assessment of the salary structure in the TMTU, and is beyond the scope of this study. Nevertheless, it is possible to benchmark the staff allocation in the TMTU across different activities and identify areas of improvement.

A review of the current staff allocation across different activities reveals that there is considerable variation in the staff to bus ratio of the SRTUs (Annex E). In light of the significant contribution of salaries towards total costs, a review of the manpower profile of the TMTU has been carried out. The current staff profile of the TMTU is given in Table 4.6.

Table 4.6 Current Manpower Profile of Thane Municipal Transport Undertaking

Category	Number
Drivers	883
Conductors	1037
Technical personnel	343
Administrative staff	117
Traffic supervisors	151
Total	2531

The exact staff allocation that the TMTU needs is a function of the number of buses that it operates. In order to determine the exact number of employees required and the number that is likely to be in excess, the TMTU's staff to bus ratio for drivers, conductors, administrative personnel, and traffic supervisors was compared with those of other urban SRTUs (Table 4.7). Based on this comparison, staff-to-bus ratios for various activities have been recommended.

Table 4.7 Staff Bus Ratio Comparisons Across SRTUs

	Administration	Drivers	Conductors	Traffic Supervisors	Technical
TMTU current	0.44	3.29	3.87	0.56	1.28
ASRTU average	0.92	2.75	3.00	0.57	1.73
ASRTU best	0.38	1.90	2.05	0.24	0.84
Recommended	0.38	2.00	2.00	0.24	0.84

The staff redeployment was estimated as follows: 264 buses currently operate on city routes. Taking the recommended staff-to-bus ratio in the category of conductors and drivers, there would be a surplus of 501 conductors and 347 drivers. Similarly, there would be a surplus of 119 staff in repairs and maintenance, 16 administrative staff, and 88 traffic supervisors. The likely surplus in different categories would be as given in Table 4.8. It would be necessary either to find areas where this surplus could be redeployed or to offer them an attractive VRS. Options for redeploying the staff are described in Chapter 6.

Table 4.8 Surplus Staff in Various Categories

Category	Number
Drivers	347
Conductors	501
Technical	119
Traffic supervisors	88
Administrative staff	16

Improving Operational Efficiency

The key to improving operational performance and capacity utilization lies in better maintenance practices. Here it is necessary to improve vehicle maintenance in order to reduce the number of breakdowns and the fleet that is not on the road. In addition, route rationalization would be critical to improving the effective kilometers per bus per day and the occupancy of these buses. This would require buses to be plied on corridors with a large demand, as also improved traffic management to reduce the dead kilometers. These two key strategies, fleet maintenance and route rationalization, are explored in detail in Chapter 6. In addition, options for staff redeployment to improve employee productivity are also presented there.

5 Beneficiaries of Transport Subsidies in Thane

One deliverable of this assignment is to delineate the beneficiaries of the subsidy in public transport. This would facilitate identification of non-intended beneficiaries and help in targeting the subsidy better. To identify the beneficiaries of the subsidy, it is necessary to estimate the costs of operation and compare it with the revenue that is generated from fares. In addition, since a significant component of the revenue is realized from sources other than fares, this would have to be accounted for in the estimation of the subsidy. The difference between revenues and costs would reveal the extent of universal subsidy for all public transport commuters in Thane.

The shortfall in revenue generation in providing public transport in Thane has been estimated in Chapter 3. In part, this shortfall could be due to the fares being lower than the cost of service delivery. In addition, specific commuter categories are entitled to fares lower than normal, and hence receive direct subsidies from the Thane Municipal Transport Undertaking. This chapter lists these commuter categories and estimates the subsidy to each category.

Tariff for Public Transport in Thane

Ninety-eight percent of traffic revenue of the TMTU (Thane Municipal Transport Undertaking) is accounted for by tickets and passes (the latter is referred to as Concession Earnings) (Table 5.1) with tickets being the predominant revenue generation mode.

Table 5.1 Traffic Revenue of Thane Municipal Transport Undertaking

Item	2002-03	2001-02	2000-01	1999-00	1998-99
Ticket Earnings	95.01%	96.29%	95.86%	96.46%	96.65%
Concession earnings	2.84%	2.13%	2.36%	2.22%	1.92%
Luggage rent	0.00%	0.00%	0.00%	0.00%	0.00%
Fines (passengers)	0.08%	0.07%	0.14%	0.10%	0.12%
Excess from conductors	0.01%	0.00%	0.00%	0.00%	0.00%
Earnings from police grant	1.98%	1.39%	1.60%	1.15%	1.14%
Sale of time-table booklets	0.00%	0.00%	0.00%	0.00%	0.00%
Refund on child nutrition tax	0.08%	0.13%	0.03%	0.08%	0.17%
Total (Rupees million)	442.78	422.42	358.82	303.54	267.94

The general fare structure of tickets and passes of the TMTU is described in Table 5.2. The TMTU has a multiple stage telescopic fare structure, that is, the fare per kilometer falls as the travel distance increases. The fares for monthly passes are based on the assumption that a person makes two trips per day and that the pass is used for 26 days in a month.

Table 5.2 Public Transport Fares in Thane (Rupees)

Distance (km)	Ticket fare	Cost of monthly pass
0-2	3.00	156.00
2-4	4.00	208.00
4-6	5.00	260.00
6-8	6.50	338.00
8-10	7.00	364.00
10-12	7.50	390.00
12-16	8.50	442.00
16-22	10.50	546.00
22-24	12.00	624.00
24-28	13.00	676.00
28-30	14.00	728.00
30-34	15.00	780.00
34-38	16.00	832.00
38-40	17.00	884.00

Specific commuter categories are entitled to cheaper fares. These include students, physically challenged commuters, freedom fighters, and police personnel. The subsidy to the former three categories is described in Table 5.3. Students and physically challenged commuters are entitled to passes and tickets at half the general fare on production of an identification card by the former and a visual inspection of the latter. Freedom fighters are allowed to travel free on production of appropriate identification. It is important to note here that the subsidy that is being provided to the above listed commuter categories is not based on costs but on fares.

Table 5.3 Subsidies for Specific Commuter Categories

Category	Subsidy
Students	50% of the total fare
Physically challenged	50% of the total fare
Freedom fighters	100% of the total fare

Police personnel currently employed by the Maharashtra State Police and stationed in Thane are entitled to travel free of cost on the TMTU buses. This

cost is partially reimbursed by the state government through the Police Grant. The formula for estimating the Police Grant is as follows:

5.1..... 1/3 (Total Police Personnel)*Average fare per return trip*365

Hence, the subsidy due to police personnel amounts to about 66%. However, this grant may no longer be available to them since the state government has now allowed a daily conveyance allowance for police personnel.

Joint Ticketing

Joint ticketing is a practice adopted by the TMTU to use redundant ticket blocks or issue tickets for denominations where tickets have not been printed. This comes about either when ticket blocks of a particular denomination are not available or when ticket blocks of denominations that have been rendered redundant subsequent to tariff restructuring are available. This situation is being faced by the TMTU as a result of a tariff increase effected in January 2003.

In January 2003, a work order was issued by the TMTU to effect joint ticketing (Table 5.4). Joint ticketing is currently practiced to issue half tickets to children, and to passengers carrying luggage in excess of 20 kg. based on a visual appraisal by the conductor. In that event, ticket fares are charged at 1.5 times the fare applicable to the particular passenger trip. Joint ticketing uses one basic ticket and one or more half-tickets (printed separately from the basic ticket). Half-tickets of the same denomination are also issued with different basic tickets.

Table 5.4 Thane Municipal Transport Undertaking Work Order for Joint Ticketing

Ticket Denomination	Basic Ticket	Additional Ticket (Issued from half ticket blocks)
Adult tickets		
4.00	2.50	1.50
8.00	5.50	2.50
10.00	8.50	1.50
12.00	9.50	2.50
13.00	10.00	3.00
14.00	10.00	2.00 + 2.00
15.00	10.00	2.50 + 2.50
16.00	10.00	3.00 + 3.00
Children's tickets		
3.50	1.00	2.50
4.00	1.25	2.75
5.00	2.50	2.50
6.00	3.00	3.00
6.50	1.50	2.50 + 2.50
7.00	1.00	3.00 + 3.00
7.50	2.50	2.50 + 2.50
8.00	2.50	2.50 + 3.00

The concern with joint ticketing is that ticket sales do not truly reflect the actual distance traveled. Thus, a half-ticket of denomination Rs 2.50 as part of joint ticket could imply the sale of a Rs 8.00, Rs 12.00, or Rs 15.00 ticket since the same type of Rs. 2.50 ticket denomination is a component of all the joint tickets making up the above ticket denominations. Moreover, it could also be a half-ticket issued to a concession beneficiary for a 6-kilometre trip or to a passenger carrying luggage in excess of 25 kg for a passenger trip of 6 kilometers amounting to a fare of Rs 5.00.

There are other issues in this approach. Firstly, since the actual demand for travel distances cannot be ascertained accurately in the absence of a mechanism for segregation of half tickets being issued with different basic tickets, it would be necessary to carry out surveys to collect primary data for demand estimation. Secondly, demand assessment of various subsidy beneficiaries is not possible since there is no segregation mechanism for identifying half-tickets issued independently or as part of joint tickets. Finally, the Child Nutrition Tax may not be determined with accuracy, since it is applicable only on tickets sold on a concessional basis and not on those issued as part of joint tickets. This could lead to a revenue loss either to the Regional Transport Authority or to the TMTU.

It is, thus, imperative that the adopted methodology for ticketing reflects the distance traveled as a function of the tariff denomination. Any form of ambiguity in this aspect can result in demand forecasting errors and non-optimization of routes.

Subsidy in Public Transport in Thane

The universal subsidy on public transport in Thane arises from the overall revenue shortfall estimated in Chapter 3. This section presents an analysis of the universal subsidy and a comparison with the fares. In addition, subsidies for specific commuter groups are also presented.

A three-step methodology has been used in the analysis. The first step is to estimate the total fixed cost per passenger. This is the minimum and fixed cost that each passenger costs the TMTU, and should be accounted for in the tariff. This includes all cost components included in Total Annual Costs (TAC) other than Variable Costs spread over the total demand base, that is, total passenger trips (Table 5.5). Non-Traffic Earnings (NTE), spread over all passenger trips, are then deducted from this cost. The total number of passengers has been ascertained by extrapolating the total number of tickets sold in the first eleven months of the current financial year and the number of passes in operation to cover the entire financial year.

Table 5.5 Fixed Costs and Non-Traffic Revenue per Passenger in Thane Municipal Transport Undertaking (2002/03)

Item	Rupees Million	Rs per passenger
Fixed Costs		
Capital Costs	62.47	0.46
Annual Fixed Costs	2.80	0.02
Semi- variable Costs	211.56	1.55
Taxes and other liabilities	39.61	0.29
Non-Traffic Revenue	5.31	0.04
Net	311.13	2.27

The next step is to apportion Variable Costs across all passengers. Here, the sum of the annual Variable Costs, incurred by the administration, workshop, and traffic departments, is spread over the total passenger kilometers served by the TMTU. The total passenger kilometers are defined as the product of the total kilometers traveled by the entire the TMTU bus fleet and the average number of passengers carried per kilometer. The TMTU achieved a load factor of about 79% during the first eleven months of the current financial year, and a bus

capacity of 66 persons (54 seating and 12 standing), along with an average daily utilization of 222.55 km per bus. These estimates are presented in Table 5.6.

Table 5.6 Variable Costs per Passenger Kilometer in Thane Municipal Transport Undertaking (2002/03)

Item	Rupees Million	Rupees per passenger kilometer
Traffic	141.92	0.14
Workshop	50.16	0.05
Administration	16.27	0.02
Total	208.35	0.21

The final step in the analysis is to compile the above two cost items and compare them with the current fares. From Table 5.5 and 5.6, it is clear that each passenger costs Rs 2.27 for every passenger trip that is made and Rs 0.21 per km traveled. For instance, the cost of traveling 5 km would be Rs 2.27 plus Rs 0.21 times 5, that is Rs 3.32. In other words, the marginal cost per passenger kilometer is Rs 0.21 while the fixed costs are Rs 2.27 (Figure 5.1).

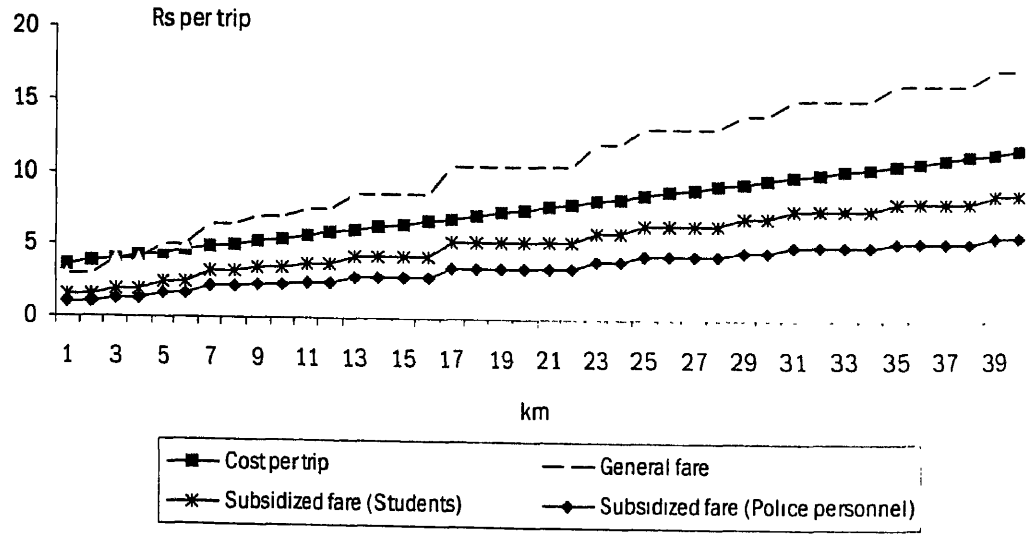


Figure 5.1 Fare and Cost Comparisons per Trip in Thane Municipal Transport Undertaking

As evident in Figure 5.1, trips beyond 5 km yield more to the TMTU by way of fares than they cost. However, subsidized categories of commuters, students, freedom fighters, police personnel, physically challenged persons, and senior citizens impose a net cost burden on the TMTU.

Towards a Rational Tariff Policy

It is clear from the above analysis that the current tariff structure does not reflect the cost of service delivery. However, taking into account the analysis in Chapter 4, these tariffs would be sufficient to cover the costs with efficiency improvements. Determination of costs due to inefficient operations and assessment of potential cost reduction measures is critical before any step is taken towards restructuring tariff structures.

Currently, the Transport Committee fixes the fares for bus services. These are usually a compromise between competing pressures on the TMTU for an enhancement in the fares and pressures from commuters for not effecting any increase. Usually, the motivation for seeking enhancements in the fares is an increase in the input costs. Besides, there is neither a stated formula for the automatic enhancement of fares with increases in the prices of critical inputs such as diesel, nor a periodic assessment of the need for any increase in fares. Therefore, bus fare hikes tend to be infrequent and ad hoc, but steep. Thus, the entire system of fixing fares is unscientific and guided more by political than economic considerations. In addition, in the eventuality of operationalization of the Mass Rapid Transit System in Thane, tariff design between urban bus and rail systems needs to be coordinated.

The existing state of affairs is not conducive to the healthy operation of public transport services by private operators. It is necessary to have a system under which fares are fixed on economic considerations rather than political ones. A framework for a rational tariff policy is presented in Chapter 6.

6 Strategies for Reducing Subsidies

The analysis of the previous chapters outlines the issues of concern in public transport operations in Thane. The TMTU's continuing losses combined with the TMC's inability to subsidize public transport operations has led to a fall in capital investments. There has been a deterioration in capital productivity and utilization, and a fall in the share of public transport. Fortunately, substantial cost reductions are possible through efficiency improvements. As estimated in Chapter 4, this by itself would be able to eliminate the subsidy in the TMTU's public transport operations. Finally, specific commuter groups have been identified for receiving a subsidy without quantification, leading to concerns on how effectively this subsidy has been targeted.

Directions for reforms have been suggested in the earlier chapters. These are described below in detail.

Reducing Operating Costs: Need for Improved Vehicle Maintenance

Vehicle maintenance is a key factor in the determination of the quality of service being provided. The need for vehicle maintenance is based not only on the quality of service that the TMTU intends to provide, it is also essential for achieving a competitive advantage vis-à-vis other modes of transport. Given the availability of alternatives for commuters, the choice of travel mode would be largely governed by the quality of service. This is important since traffic earnings, the major component of revenue in this sector, are dependent on the portion of the demand base captured by the TMTU.

The maintenance strategies depend largely on the operational goals and policies of the service provider. However, the choice of degree of maintenance to be provided by the operator requires careful consideration. Intensive vehicle maintenance entails higher costs but provides better quality service in terms of near-zero breakdown rates, punctuality, and reliability of service. Modest or no vehicle maintenance, on the other hand, requires less investment, but is accompanied by declines in the load factor and revenue. Operators that aim to provide a high quality of service to commuters resort to intensive vehicle

maintenance, while operators with limited financial resources generally provide modest maintenance.

The TMTU is not inclined towards quality of service for two reasons. First, the provisions of the Bombay Provisional Corporations Act, 1949, for transport undertakings do not address the issue and secondly, the availability of finances from the TMC is too limited for proper fleet maintenance. The first step towards improving operational performance, and thereby reducing operating costs, is the formulation of a strategy and its consequent operational objectives, goals, and policies, which will optimize cost reduction with revenue generation. The following sections focus on three key areas that can reduce operating costs and improve fuel efficiency in the TMTU, and provide the outline for a fleet maintenance policy. A detailed assessment of the vehicle maintenance practices in the TMTU is necessary to develop specific strategies for implementing these policies.

Selection of Tyres and Spares

Selection of tyres must be made in context of the climate and topography within which the buses are expected to operate. Moreover, certain tyres would give a higher retreaded life. Selection of spares, too, is of critical importance since they ultimately affect the lifespan of the vehicle. Both these would be critical for improving fuel efficiency.

Vehicle maintenance is of critical importance for reducing operational costs and enhancing the useful life of vehicles. A reduced cost burden necessarily implies less dependence on measures for bridging the expenditure-revenue gap, as increases in tariffs that may adversely affect the demand base and consequent revenue generation. The TMTU, in place of the standard policy of purchasing the least expensive make of tyre and spares, must make an informed decision. As it is difficult for a state run undertaking to avoid competitive tendering to negotiate higher quality, a useful policy would be to introduce performance contracts in the tendering process. This would enable the TMTU to introduce quality considerations in competitive tendering.

Bus Replacement Policy

This policy would emerge from the operational goals and policies that the TMTU has to determine. In view of the direct correlation between quality of service and demand, buses should be replaced once operational costs exceed operational earnings. A comparison across other SRTUs reveals that there is a wide variation. For the BEST the working life of a bus is 15 years, whereas, for the

DTC and the CSTC, it is only 8 years (Table 6.1). Translated into kilometers, the comparison of prescribed age limits becomes even more complex.

Table 6.1 Serviceable Life of Buses Across Urban Bus Undertakings

Operator	Years	'00 thousand kilometers
DTC	8	5.00
BEST	15	10.00
CSTC	8	4.00
CNI-I	10	7.00

Hence, a detailed exercise documenting the deterioration in vehicle performance over its lifetime is necessary in the TMTU to determine the optimal life of its buses and hence determine the bus replacement policy.

Bus Selection

The choice of new buses must be made keeping in mind, among other aspects, the suitability of the vehicle for the state government's fuel policies[a], environmental standards[b], carrying capacities, technological innovations and availability of spares, etc. Standardization of buses to be purchased reduces costs required in the long run for different types of spares, addresses the issue of non-availability of these spares that leads to longer repair periods and the consequent potential loss of revenue generating kilometers, and the expertise required for effecting maintenance.

Optimizing Capital Utilization through Route Rationalization

The bulk of the TMTU's revenues come from traffic earnings, which are a primary source for recovering costs. This requires efficiently designed routes such that each bus plies on a route that has sufficient passengers for the bus to recover its costs of operation.

However, as Thane has grown, interfacing with multiple authorities and meeting the rapidly growing mobility demand has strained the TMTU's resources. Ad hoc adjustments in routes due to community pressures have increased the problem. Thus, direction-oriented routes have been replaced by a number of stand-alone routes. This also has the added problem that it is no longer possible to identify loss-making routes from profit-making routes

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[a] For example, policy towards introduction of CNG (Compressed Natural Gas) or ULSD (Ultra Low Sulphur Diesel) as a fuel.

[b] Policy regarding introduction of Euro III and Euro IV buses.

because a number of routes overlap, and hence, traffic being catered to cannot be distinguished.

Analyses of spatio-temporal diurnal variations that exist in the demand for public transport in Thane can enhance the efficiency of public buses. A route rationalization exercise would be a useful tool in this regard. This exercise would document the existing routes, route length, daily temporal variations in traffic on each route, buses plying on each route, their frequency, and number of passengers per trip per route. This exercise would be able to highlight the existing demand-supply gap and help identify profitable routes. The information collected by this exercise would be useful for the TMTU to optimize bus utilization. In particular, the following benefits would emerge from a route rationalization exercise:

- Identification of routes that generate heavy demand.
- Daily route variation, that is, peak time and off-peak time demand. Therefore, the TMTU would be able to assess when to increase or limit the frequency of buses on a given route.
- Common origins and destinations, where the TMTU could concentrate its service delivery.
- Help the TMTU in combining certain routes, where bus operation would be more viable.

It must be noted here that the Motor Vehicles Act, 1988, provides sufficient authority to the TMTU to carry out such an exercise and advise the STA. The Act spells out the detailed procedure for commencement of a bus service. The award of a permit is to be based on periodic origin-destination studies. Special provisions are made authorizing the SRTUs to formulate schemes for routes or for areas and to rationalize the services. The model of route planning in most urban areas is network-based and guided by the direction of travel, rather than the destination. This limits the number of routes and hence simplifies the planning process.

Since Thane is a circular city, it lends itself to a star-and-hub type of route network model. The route network can then be modeled in a manner similar to that of Bangalore, also a circular city. In Bangalore, traffic studies have identified eight linear-spike routes, one in each of eight directions radiating from the Central Business District. The BMTC (Bangalore Metropolitan Transport Corporation) is reorganizing its routes into the star-and-hub pattern to improve the operational efficiency and speed of its vehicles. It has been

observed that the frequency of services in the corridors could be doubled from six per hour to 12 per hour. A similar exercise is necessary for Thane.

Rationalizing Tariff Policy

As with other utility services, public transport operations, including fare determination, are subject to meeting universal service obligations. Hence, fixing fares for public transport is a complex issue. Because private operations are not permitted in Thane, activities such as fixing fares are not insulated from political interference. Public ownership also implies that the TMTU is not being compensated for meeting universal service obligations through strategies that address uneconomical routes, etc. Simultaneously, the gradual liberalization of the automobile industry in India since the 1980s has resulted in a shift away from public transport. This presents another concern for the TMTU, since any increase in tariffs would lead to further erosion of the ridership in public transport. For instance, the fare increase announced in Tamil Nadu in December 2001, aimed at 41% additional revenue, actually resulted in a 20% increase due to a fall in ridership. Apart from the financial viability of public transport, this fall in ridership has implications for increasing congestion, pollution, and fatalities in the transport sector. Thus, the TMTU is faced with a unique challenge where fare increases are constrained by a shift away from public transport leading to loss in traffic and political interference. Simultaneously, fare increases are considered necessary to ensure financial viability.

Nevertheless, tariff determination is the primary tool for creating an enabling environment for dynamic and sustainable growth of public transport. Ideally, tariffs should reflect true economic cost. However, due to difficulties in estimating the externalities caused by meeting transport demand, fares should be determined in a manner that leads to an optimum level of investment, operation, and demand in the transport sector. The principles that need to be considered while designing tariffs are detailed in Table 6.2.

Table 6.2 Principles of Tariff Determination

To promote efficiency and economy in the activities of the sector	▪ Provide incentives through tariffs for good performance and for improving the quality of supply and service to consumers. ▪ Design tariffs to promote an optimum level of travel demand for buses specially in the context of alternative modes of transportation like two-wheelers and three-wheelers.
To secure the financial viability of the entities in the sector	▪ Entitle the TMTU to recover only reasonable and efficient costs incurred in operating and maintaining the service. ▪ Assure investors of recovering the capital costs including a reasonable rate of return on the investment.
To provide incentives for optimum investment	▪ Ensure that the tariff structure and design will be such that it attracts the necessary investment to the sector.
The tariff should reflect the cost of supply	▪ That consumers, to the extent possible, will pay according to the cost incurred in providing supply and service. Wherever the government wants a certain group of consumers to be subsidized, it will make a corresponding allocation from the state budget.
The tariff should be fair, just and non-discriminatory	▪ To the extent possible, tariffs should not discriminate against any consumer(s) to burden them with unjustified costs. However, tariffs for particular consumers, like handicapped consumers, etc., should be directly subsidized from the government budget.
The tariff structure will be unbundled to reflect the cost of providing different services	▪ To the extent possible, the tariff structure would be unbundled, i.e., the cost of providing different services will be shown separately.

While Table 6.2 provides guidelines on tariff setting, it should be recognized that there might be a conflict between the objectives sought. For instance, increasing the share of public transport and issues of social sustainability would require that the fares be kept sufficiently low, while efficiency improvements and viability issues may require periodic fare increases. Thus, it is important for the regulatory agency in this sector to balance these objectives to achieve a sustainable outcome. Similarly, to ensure that the overall objective of increasing the share of public transport is met and to achieve environmental standards and universal service obligation, the government may, as a policy, subsidize public transport operators.

Demand for Public Transport Services

Ridership in public transport is sensitive to tariff increases. This phenomenon has been accentuated after the liberalization of the automobile industry. Thus, bus fares would have to be benchmarked on the basis of alternative modes of

transport to ensure that modal shift is checked. To ensure that the modal shift towards personal vehicles is checked, the quality of public transport has to be improved, and its cost competitiveness retained. Similarly, buses are considered to have a pro poor image in the sense that the economically challenged sections of the society are a captive market for public transport. Hence, to address issues of social sustainability, it is imperative that public transport services be run efficiently to keep fares sufficiently low to cater to such commuters.

Efficiency Improvements to Reduce Costs

As mentioned in Table 6.2, tariffs should provide incentives for efficiency improvements to reduce costs of operation. Discussions in Chapter 4 have emphasized the need for improvements in bus operations and highlighted the implications for operating costs. Finally, it is imperative that external costs, such as congestion and pollution, be incorporated into the fare determination process to reflect the true economic value of the service delivered.

Subsidy Administration

Wherever the government desires that a particular class of consumer be provided public transport services at subsidized fares, it is recommended that allocations be made explicitly by the exchequer. Subsidies may also be merited in case public policy demands that fares be kept low to ensure that the share of public transport is increased. Nevertheless, the need for subsidy should be assessed rather than assumed to exist, because the inclusion of unintended beneficiaries reduces the efficiency of the subsidy and increases the burden on the taxpayer. It is important that subsidies are well targeted such that they minimize unintended beneficiaries. A proper assessment of the subsidy need and the willingness and ability to pay is required.

The TMTU caters at subsidized fares to several special commuter groups. These include students, physically challenged commuters, freedom fighters, and police personnel. These services are essentially to meet the universal service obligation in the transport sector. They can be categorized as peak hour services provided by the TMTU on routes with heavy traffic of these groups. Though these services are popular, the operations are generally loss making since the commuters have concessional passes (Figure 5.1). Thus, the issue here is not the provision of these services, but concessional passes. This problem could be resolved by introducing a mechanism for the government to compensate an operator for loss of revenue because of services being used by concessional pass holders.

Fare Revisions

Fare revisions are usually a compromise between competing pressures from operators for an enhancement in the fares and pressures from commuters for not effecting any increase. Invariably, there is a time lag between an increase in input costs and an increase in fares that could lead to delays in fleet augmentation and replacement, and thus poor quality of service. However, for improvements in service quality, fare revisions should be rationalized and made systematic. Improving financial performance of TMTU necessitates that fares reflect the true cost of service delivery. For this purpose, costs and efficiency in service delivery by TMTU should be monitored periodically to ensure that revenue generation is in consonance with incurred costs. Revision of fares is an exercise that may need to be undertaken periodically in the event of other initiatives not generating sufficient revenue.

Resource Mobilization for Augmenting Public Transport

The TMTU provides public transport services using its own fleet. Apart from operating bus services, the TMTU also maintains infrastructure to repair and maintain buses. The TMTU's repairs and maintenance wing provides technical support to its own buses only and not to private bus operators. Thus, there exists a resource of technically competent manpower, which can be used to service additional vehicles. The TMTU also owns land for parking buses (at depots) and passenger terminals for providing traffic interchanges, another significant asset.

It is possible to classify the activities of the TMTU under the following independent heads:

- Operation of buses
- Carrying out repairs and maintenance
- Provision of parking facilities for buses, terminal facilities for passenger interchanges, and bus stations.

The three activities mentioned above, are independent of each other in that they require an independent operational structure and separate manpower, but do not function as separate profit centers.

Lessons from Reform Initiatives Elsewhere

An examination of the reforms carried out around the world reveals two basic trends in the restructuring of public transport. The first is towards unbundling monolithic and integrated services into more manageable and compact

constituent units. This has generally preceded a greater involvement of the private sector in providing services in a competitive environment.

The unbundling has, in some cases, been done on a geographic basis and in some cases, on a functional basis. Unbundling on a geographic basis was done in cases where a clear delineation of the areas of operation was possible, as in the case of the Argentina rail systems. As against this, unbundling on a functional basis was done where the different functions of a monolithic organization were a combination of activities that were natural versus non-natural monopolies.

The second trend has been to segregate policy and planning functions from operational functions. This is clearly seen in the example of London where 'Transport for London' now has only a planning and procurement function and does not own or operate buses. Operations are carried out by private operators under contract, which are monitored by London Buses Limited.

Such a restructuring has the advantage of separating activities that are natural monopolies from activities that are not, making it possible to bring competition in activities that are not natural monopolies. Competition, in turn enables:

- Improvements in efficiency
- Enhancement of capacity by tapping private financial resources
- Induction of more professional management
- Induction of state-of-the-art technology
- Greater attention to consumer convenience rather than to operational convenience.

It also becomes possible to channel scarce public funds into those activities that the public sector is best suited to perform and not use them in activities that the private sector is better equipped to perform. It also enables retention, in public hands, of only natural monopoly activities, in which competition is not possible.

It is recommended that the TMTU's three activities be unbundled into separate profit centers that will reflect the efficiency of delivery of these services. This would ensure that each can focus on its core activity without being encumbered with the activities of other wings. No separate accounts are maintained at present to allow an evaluation of which of these, if any, is a profitable activity. Hence, the unbundling of TMTU would have to be preceded by financial restructuring, along with apportioning the liabilities and assets of TMTU across the three proposed companies, structuring the debt and equity of

each company, etc. based on the broad principles for allocation of assets that have been suggested.

Bus Operations

Operating city transport is clearly not a natural monopoly because several private operators already operate services on city roads in different parts of the country. An international review also reveals that with appropriate regulation, private operations of public bus services would be successful. Keeping in view the TMTU's precarious financial position and continuing losses, as also the feasibility of bus services being provided in a competitive market, greater involvement of the private sector in operating services in the city is recommended. In this scenario, the TMTU should largely concern itself with policy-making, planning, coordination and regulation, rather than with the actual operation of services.

However, it must be noted that India's experience with private operation has not always been a success. Assessments of the privately operated buses in Delhi reveal a poor quality of service and a low level of commuter satisfaction (TERI, 2003). Nevertheless, through private sector participation, such as the Kilometer Scheme in both Delhi and Bangalore, the SRTUs have been able to increase its market share without any additional capital expenditure. The Kilometer Scheme is the most common form of service contract in public transport operations. In this scheme, the regulator sets the routes and fares. The fare accrues to the SRTU, which then pays the private operator an agreed amount per kilometer traveled, irrespective of the occupancy and ridership. The operator is thus simply a supplier of a service, insulated from the risks arising from the commercial performance of the service and concerned primarily with achieving operating efficiency and the service quality prescribed in the contract. The quality actually achieved needs to be monitored by the SRTU with a system of penalties to deter under-performance. The SRTU awards the routes via competitive tenders to the lowest bidder. Preference is given to private operators that have achieved high standards of quality. This prevents private operators from concentrating only on dense routes, and provides the private operator with the incentive to improve quality.

In using hired buses, the TMTU would be able to save on capital investments, reducing the strain on the exchequer. Hence, it is recommended that the TMTU not augment its urban bus fleet. The additional demand should be met by obtaining such services from private operators under a Kilometer Scheme. The contracts should be awarded based on competitive bidding.

Nevertheless, it is possible to establish an upper bound for the rates per kilometer: these should not exceed the variable costs per kilometer of operating buses (Table 6.3). Since fixed and semi-variable costs would have to be borne by the TMTU in any case, any reduction in the variable costs would imply a net savings.

Table 6.3 Variable Costs per Kilometer for Thane Municipal Transport Undertaking Buses

	Rs per km
Administration department	0.83
Workshop department	2.56
Traffic department	7.24
Total	10.63

To avoid the pitfalls associated with the Kilometer Scheme, it needs to be recognized that the cost of operation would vary from route to route and time of day. The cost of operation on a high-density route with frequent and longer stops and a higher load factor would be higher than on a lower density route. Similarly, peak hour operations would be more expensive than off-peak operation. As a result, under such contracts, operators would prefer low-density routes and off-peak operations. In order to motivate them into peak period and high-density routes, the compensation payable should be more than in the less expensive routes. For these contracts to be successful, an effective monitoring system needs to be in place to ensure adherence to the contract. This would imply investments in vehicle tracking infrastructure.

Over time, the TMTU should phase out its own bus services by not replenishing fleets and instead substituting them by contracted services. However, some time lag is expected for developing appropriate contractual arrangements for the regime. Here, a sufficiently large state owned public bus fleet would provide stability in the sector in the transitional period during which the private sector could demonstrate its capability to service the sector. Such a gradual process would allow the TMTU to recover its investments in the public transport sector completely. Public bus operations for an initial period in competition with the private sector would enable the TMTU to set a benchmark for quality and also to enable some experience to be gained with private operators before public operation is completely stopped. A gradual process would also help build support for such reforms.

Finally, it may be prudent for the TMTU in the short term to augment their fleets to address labour issues by ensuring that the manpower surplus of drivers and conductors is reduced. The TMTU currently needs traffic personnel,

conductors, and drivers for bus operations. Based on the analysis of staff productivity in Chapter 4, it has been estimated that there is a surplus of 347 drivers, 501 conductors, and 88 traffic supervisors in the TMTU. As the operation of its own buses comes down, drivers would start becoming redundant and would need to be offered VRS (Voluntary Retirement Scheme) packages. Nevertheless, it is possible to reduce this surplus though the Kilometer Scheme. The number of buses that should be plied under a Kilometer Scheme to employ all the surplus conductors has been estimated. Given an optimal staff-to-bus ratio of two for conductors, the TMTU should obtain 251 buses on the Kilometer Scheme, about 19% of Thane's private bus population. However, given a staff-to-bus ratio of 0.24 for traffic supervisors, there would still be a surplus of 29 persons in this category.

Even with completely privatized operations, regulatory agencies would still require traffic supervisors for monitoring and planning. In fact, the requirement for personnel in this category may even go up with more intense monitoring and planning. Thus, it would be prudent for the TMTU to train some senior conductors and drivers for this responsibility to minimize the need for shedding surplus staff later stage.

Depot and Terminals

The ownership and management of the depots, terminals and bus stations are a natural monopoly and it would be inefficient for a multiplicity of operators to be involved. It is best for these to be provided as a common facility for all operators. These can still be operated as separate profit centers in the form of a separate corporation. Due to the monopoly nature of the activities proposed, it is recommended that the TMTU retain a controlling stake in this corporation, thus effecting partial divestiture. An alternative would be to allow professional management of these properties by the private sector using lease contracts. In either case, unbundling this activity from bus operations by setting up a separate corporation would facilitate the lease contracts.

This corporation should enter into contracts with private operators to permit parking within its premises wherever space is available, for an appropriate fee. In addition, this company could also earn substantial revenues by property development and advertising. It could lease out space for suitable retail outlets for additional revenue depending on space availability. This would have the twin benefits of revenue generation and improving access to public transport. As the TMTU lacks the professional expertise to develop or manage commercial property, it is suggested that separate Special Purpose Vehicles (SPVs) may be

considered for each property earmarked for development. These SPVs could be a joint venture with a strategic partner, such as a reputed property development company, which would provide the TMTU the property development and management skills not available to it.

However, it is important to recognize that commercial development of the properties allocated to this company could be more remunerative than providing parking facilities for buses, or interchanges for passengers. Thus, if the company is to operate on commercial considerations only, there might be a conflict in between providing such services and operating only on profit considerations. It is recommended that though the company should operate only on commercial considerations for commercial development of its properties, it should seek the approval of appropriate regulatory agencies in this sector.

Repairs and Maintenance Workshops

Management of the workshops and repair facilities is again not a natural monopoly; there are several private workshops at which repairs could be carried out and there is no need for public funds to be spent on these facilities. However, given the fact that substantial infrastructure for repairs already exists with the TMTU, it may be used for the repair and maintenance of all buses and other motor vehicles. However, repairs should be done on a purely commercial basis, by charging market-based fees. If this activity cannot be sustained in the public sector, then it should be privatized. It is to facilitate this that a separate company has been suggested.

All the staff of the workshops, including the mechanics and the support staff, would stand transferred to this company. This would imply a substantial cost burden on this company (Table 6.4).

Table 6.4 Workshop Expenditure in Thane Municipal Transport Undertaking

Item	Rs. Million
Fixed costs	1.30
Semi-Variable costs	36.06
Variable costs	46.72
Total	84.08

Taking the best staff-to-bus ratio for workshops among all urban SRTUs in India (Table 4.7), it is estimated that this company should service 410 buses a year. This would imply a cost of over Rs. 205,000 per bus that would have to be recovered, over 20% of the cost of a new bus. Hence, it is unlikely that this company would be able to sustain itself in a competitive market. To be able to

compete in the market, employee productivity would have to improve considerably. As an illustration, if this company were to service all the 1,506 buses in Thane, even then, the cost on each bus would be Rs 53,000 per annum.

Beyond Public Transport Reforms

The strategies suggested in this chapter would check the decline in the share of public transport in Thane and ensure that issues of social and economic sustainability in providing public transport are addressed. It would also promote sustainable resource use in the sector and encourage efficient service delivery. Yet, these alone would not be sufficient to bring about a significant improvement in the entire transport sector to meet the goals of social, environmental, and economic sustainability. It is necessary that the above described reforms be complemented with a coordinated action plan that addresses the concerns of the entire transport sector, not just the provision of public transport.

This calls for the development of an urban transport policy that develops and promotes cost-effective initiatives, mitigates adverse environmental effects while taking account of development priorities as well as social and poverty related concerns. An integrated approach for the entire transport sector would ensure that modes develop to complement one another. Mechanisms for integrated transport planning strategies and urban and regional settlement strategies to reduce the environmental impacts of transport need to be put in place.

A List of Stakeholders and Experts Consulted

Mr. K B Bhoge
Municipal Commissioner, Thane Municipal Corporation

Mr. K P Bakshi
Former Municipal Commissioner, Thane Municipal Corporation

Mr. Shridhar Bodhe
Transport Manager, TMTU

Mr. Kamlakar Dixit
Deputy Transport Manager, TMTU

Mr. Ajit Nirhali
Chief Accountant, TMTU

Mr. Guruprasad Pednekar
Superintendent, Traffic Section, TMTU

Mr. S Gholap
Head, Central Workshop Division, TMTU

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B Institutional and Regulatory Structure

In India, management of urban areas is essentially a responsibility of the state government, although the 74th Constitutional Amendment devolves the responsibility of urban development to local bodies. Urban development, and therefore, urban transport, is primarily a responsibility of the state governments in India, though some agencies that would play an important role in urban transport planning work under the Central Government with no accountability to the state government, particularly the Indian Railways. Table B.1 lists some of the agencies involved with urban transport and indicates their specific responsibilities.

Table B.1 Institutions Involved with Urban Transport in India

Organizations	Functions	Relevant acts
Urban transport planning		
Ministry of Urban Development	Overall responsibility for urban transport policy and planning	
Land Development Authority, State Government	Land use allocation and planning	State Development Acts
Roads		
Transport Department, State government	Licenses and controls all road vehicles, inspection of vehicles, fixing motor vehicle tax rates	Motor Vehicles Act 1988
Ministry of Surface Transport	Administers the Motor Vehicles Act and notifies vehicle specifications as well as emission norms	Motor Vehicles Act 1988
State Transport Undertaking, State government	Operation of bus services	Road Transport Corporations Act 1950
Public Works Department, State government	Construction and repair of state roads	VII Schedule of the Indian Constitution (Article 246), List II (State List), Item 13
Local municipality	Construction and repair of smaller roads, road signage, traffic lights, licensing and control of non-motorized vehicles, clearing of encroachments and land use planning	Constitution (Seventy-Fourth Amendment) Act, 1992
Police	Enforcement of traffic laws and prosecuting violators	State Police Acts
Railways		
Ministry of Railways	Own and operate urban rail transit systems wherever they exist	Railway Act, 1989
Others		

Organizations	Functions	Relevant acts
Ministry of Petroleum and Natural Gas	Regulation of prices and quality of transportation fuels	Essential Commodities Act, 1955 The Petroleum Rules, 1976
Department of Environment, State Government	Monitoring air quality	

C Legislative Framework

The two enactments that regulate the functioning of public bus transport services are the Motor Vehicles Act, 1988, and the Road Transport Corporations Act, 1950. The Indian Railways Act, 1989 regulates rail transport. Other legislations that have implications for the transport sector are the Tramways Act, 1950, and miscellaneous municipal legislations.

· Vehicles Act, 1988

The Motor Vehicles Act provides for two types of road transport vehicles for the carriage of passengers, stage carriages and contract carriages. A stage carriage is one where fares are charged on individual passengers either for the whole journey or for stages of the journey. A contract carriage is required to be engaged under a contract for the use of such a vehicle as a whole. The fare or compensation payable for hiring of contract carriages has to be on a time basis or on a point-to-point basis. Contract carriages are not allowed to pick up or set down passengers en route.

Section 66 of the Motor Vehicles Act also requires that all such stage and contract carriage buses have a permit. Permits are to be obtained from a Regional Transport Authority (RTA) or State Transport Authority (STA). In granting the stage carriage permit, the RTA/STA may attach the following conditions.

- The area or route on which the stage carriage may be used
- The date from which the stage carriage may start operating
- The minimum and maximum number of daily trips to be provided on any route and on specified days
- The time table as approved by the STA/RTA be exhibited on the stage carriage
- Deviations from the time table within which it must be operated
- Restrictions on taking and setting down passengers at points other than specified points within a municipal area
- Maximum number of passengers and maximum weight of luggage that may be carried

- Free allowance for luggage and rate at which excess luggage is to be charged
- Specifications with regard to the body of the vehicle
- Standards of comfort and cleanliness
- Conditions, subject to which, goods may be carried on stage carriages
- Fares that may be charged
- Specifications with regard to the tickets to be issued
- Conditions for carriage of mail
- Conditions under which the vehicle may be used as a contract carriage
- Arrangements to be made for the housing, maintenance, and repair of the vehicle
- Use of and payment of fee for any specified bus station or shelter.

Similarly, the following conditions may be attached to a permit for a contract carriage:

- Area or route on which the contract carriage may be used
- Restrictions on contracts outside the specified area
- Maximum number of passengers and weight of luggage that may be carried
- Conditions under which goods may be carried
- Specified maximum rates for hiring of such contract carriages
- Standards of comfort and cleanliness to be maintained.

Section 67 (1) (i) permits the state government to fix the fares for stage and contract carriages.

Sections 71 (3) (a) and 74 (3) (a) provide for the Central Government to impose limits on the total number of such stage and contract carriage permits that may be granted, having regard to the number of such vehicles, road conditions, and other relevant matters This provision is applicable only in urban areas with a population with more than 0.5 million.

Apart from the above, the Motor Vehicles Act regulates the registration of every vehicle and the grant of licenses to personnel who would be operating such vehicles. Section 39 requires all motor vehicles to be registered. Further Section 56 requires all 'transport' (not personal) vehicles to carry a certificate of fitness, without which the registration is not valid.

Chapter VI of the Motor Vehicles Act offers special provisions for State Transport Corporations. If a state government is of the opinion that for the purpose of providing an efficient, adequate, economical and properly

coordinated road transport service, it is necessary that such services, in general or any particular class of such services be run and operated only by the SRTU and to the exclusion of any other operator, then the state government may implement such a scheme after it has formulated a proposal and given an opportunity to the interested people to file their objections, if any. The Act requires the objections to be heard and disposed of first.

Once such a scheme is finally notified, the SRTU may apply for permits as per the scheme and the required permits shall be granted by the STA. The STA may refuse to entertain applications for permits from others and even cancel or modify the terms of any existing permit. The Act provides for a compensation to be paid to any permit holder whose permit is cancelled or curtailed because of a notified scheme coming into force.

Road Transport Corporations Act, 1950

The Road Transport Corporations Act, 1950, provides for the setting up of Road Transport Corporations by each state government, having regard to:

- The advantages offered to the public, trade, and industry by the development of road transport
- The desirability of coordinating any form of road transport with any other form of transport
- The desirability of extending and improving the facilities for road transport in any area and of providing an efficient and economical system of road transport service.

The Act lays down the procedures for the management of the corporation and prescribes the duties and functions of the corporation's functionaries. It also provides the procedures for appointment and removal of the top functionaries. It is provided, under Section 18 of the Act, that the duty of the corporation shall be to provide or secure or promote the provision of an efficient, adequate, economical, and properly coordinated system of road transport services in the state.

Indian Railways Act, 1989

Rail transport is governed by the provisions of the Railways Act, 1989. This Act requires that no railway be opened for public carriage of goods and passengers until the Central Government has sanctioned the opening of the railway. Before sanctioning the opening of the railway, the Central Government is required to obtain a report from the Commissioner of Railway Safety as to the safety aspects

of the railway system. Besides, Section 30 requires the Central Government to fix the rates for carriage of passengers and goods. Thus, the Central Government is responsible for ensuring the safety of rail transport systems and fixing the fares.

Indian Tramways Act, 1950

This act authorizes the construction of tramway systems by local bodies or any persons with the authorization of local bodies (Section 4). Therefore, private operation of such systems is permitted under the law. The tramway systems defined in the legislation are distinct from railway systems. If the tramway system lies within municipal limits, then the licensing authority would lie with the state government. In other cases, the Central Government would regulate the licensing and functioning of tramway systems as with other railway systems under the Indian Railways Act, 1989. The license terms for tramways would prescribe the gauge for operation, the motive power to be used, the technical specifications of the system, the fares that can be charged, among other things (Section 7). The Act also provides for the license of the operator to be cancelled after three years if operations are found unsatisfactory (Section 17).

Municipal Acts - The Bombay Provincial Municipal Corporations Act, 1949

The Bombay Provincial Municipal Corporations Act, 1949, is valid in Maharashtra and Gujarat. This Act permits the municipal corporations to create and operate public transport undertakings and operate in the manner permitted under the Motor Vehicles Act, 1988. Significantly, there is no provision in the legislation to permit local bodies to license private operators to run public transport services.

Section 25 provides for creation of a transport committee in the eventuality that the Municipal Corporation either acquires or establishes a Transport Undertaking. This Committee of 13, is to be constituted of individuals with proven competence in the disciplines of administration, transport, engineering, industrial, commercial, financial, and/or labor matter. These members may or may not be elected councilors. While the corporation will appoint 12 members, the Chairman of the Standing Committee of the municipal corporation will be the ex-officio member of this Committee. One half of the appointed members will retire every two years, and elected councilors who are members of this Committee will cease to be a part in the eventuality of their being disqualified from being a councillor. A Chairman, duly appointed by members of the

Committee, heads the Transport Committee. The Transport Committee is also empowered to appoint sub-committees from time to time for inquiries and/or opinions on issues related to public transport within the municipal corporation's jurisdiction.

Section 27 enables the appointment of a Transport Manager, under the superintendence of the Transport Committee and the municipal corporation, to head the Transport Undertaking. Broad responsibilities of the Transport Manager are outlined in Section 342. The Transport Manager is expected to perform all acts necessary for the economical and efficient maintenance, operation, administration, and development of the Transport Undertaking. This includes:

- Construction or acquisition of mechanically propelled transport facilities
- Construction of buildings and works necessary or desirable for operation and development of the Transport Undertaking
- Purchase or lease or hire any form of moveable and immovable property or rights
- Exercise any of the powers of a licensee for holding a stage carriage permit under the Motor Vehicles Act.

Sections 344 and 345 state the procedures to be followed for acquisition and disposal of properties. Under provisions of these sections, the Transport Manager is vested with the powers to acquire immovable property on behalf of the corporation, and will be notified for acquisition by the state government for the municipal corporation in the eventuality of the Transport Manager being unable to do so. In any manner of acquisition, the Transport Manager is required to make all the necessary payments. In addition, the transport manager may grant a lease on any immovable property of the municipal corporation for a period not exceeding 12 months, provided that every lease valued at more than Rs 3,000 shall be notified to the Transport Committee. Hence, private sector participation forms such as lease, ROT, and concessions would require approval from the Transport Committee. The transport manager, on explicit sanction of the Transport Committee, also performs the following activities:

- Sale of movable property not exceeding Rs 10,000, lease on any immovable property belonging to the corporation for a period exceeding one year, and sell or grant a lease in perpetuity of any immovable property belonging to the corporation whose value does not exceed Rs 50,000

- Transactions involving sale of movable property valued in excess of Rs 10,000 or sale and lease of movable and immovable property valued at more than Rs 50,000 require the sanction of the municipal corporation.

Section 343 provides for levy of fares and charges in lieu of services provided by Transport Undertakings and penalties in the event of default.

All fares and charges leviable for the conveyance of passengers and goods by any means of transport provided by the Transport Undertaking is fixed by the Transport Committee with the approval of the municipal corporation. A printed list, in English and Marathi, of all fares is to be put on display at prominent locations within each bus. This fare is payable to conductors. Ticket-less travelers are liable to be fined the maximum fine of Rs 50. In this context, the Transport Manager is empowered to apply to a judicial magistrate for recovery of the fine amount.

D Cost and Revenue Streams of Thane Municipal Transport Undertaking

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
Section A: COST STREAMS							
A.1	Capital Costs						
A.1.1	Annualized Capital Costs						
	Depots						
1	Land and buildings	16,790,306.47	16,213,596.29	15,922,153.62	15,245,669.54	14,570,862.93	Historical capital expenditure on buildings annualized using CRF
	Buses						
2	Buses	27,709,050.56	27,709,050.56	27,709,050.56	25,186,397.48	25,186,397.48	Historical capital expenditure on purchase of buses annualized using CRF
	Sub-Total (A.1.1) = (1 to 2)	44,499,357.02	43,922,646.85	43,631,204.18	40,432,067.02	39,757,260.42	
A.1.2	Depreciation						
	Buses						
1	Buses	13,438,768.66	12,831,375.16	11,903,167 89	11,903,167.89	10,850,483.63	Depreciation rate based on life of bus
2	Land and buildings	4,528,591.14	4,316,722 43	4,241,037.98	4,054,670.82	3,873,301.97	
	Sub-Total (A.1.2) = (1 to 2)	17,967,359.80	17,148,097.59	16,144,205.87	15,957,838.71	14,723,785.60	
	Sub-Total (A.1) = (A.1.1 + A.1.2)	62,466,716.83	61,070,744.44	59,775,410.05	56,389,905.73	54,481,046.01	
A.2	Annual Revenue Costs						
A.2.1	Annual Fixed Costs						
	Depots						
1	Purchase of vehicles	800,000.00	19,900.00	0.00	0.00	302,190.00	Self explanatory
2	Purchase of typewriters, Xerox machines	500,000.00	10,320.00	303,797.00	35,939.50	64,974.70	Self explanatory

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
	3 Furniture	400,000.00	256,226.00	66,422.00	102,595 48	99,462 00	Self explanatory
	4 Security goods	100,000.00	0.00	3,800.00	67,134 50	0 00	Self explanatory
	Workshops						
	5 Machinery	900,000.00	1,267,275.00	549,095.50	1,004,023 00	1,484,288 53	Self explanatory
	6 Mechanical and General tools	100,000.00	35,227.00	67,273.30	181,324 91	23,974 00	Self explanatory
	Buses						
	7 Bags, punches	0.00	36,420 00	24,403.00	17,500 00	239,084 10	Self explanatory
	Sub-Total (A.2.1) = (1 to 7)	2,800,000.00	1,625,368.00	1,014,790.80	1,408,517.39	2,213,973.33	
A.2.2	Semi - Variable Costs						
	Depots						
	1 Salary (Administration Dept.)	7,663,974 55	8,154,280 00	5,248,695 00	4,704,901 00	3,595,542 00	Salaries of personnel employed in the Administration Department This department has only permanent employees
	Workshops						
	2 Salary (Workshop Dept.)	31,630,412.73	32,613,356.00	29,501,679.00	23,204,436 00	18,047,567 00	Salaries of personnel employed in the Workshop Department This includes both permanent and temporary employees
	Buses						
	3 Salary (Traffic Dept.)	146,259,864.00	132,188,170.00	112,118,688 00	97,185,718 00	75,944,653 00	Salaries of personnel employed in the Traffic Department This includes both permanent and temporary employees
	Common expenses: Divided in proportion to other expenses						
	4 Stipends	650,251.64					This amount is disbursed to employees on training for tours
	5 Medical allowance	2,644,000.00	4,150,206.00	1,324,496.00	8,550.00	13,500 00	Allowance to employees for medical and health purposes.

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
6	Leave Travel Allowance	1,078,352.73	1,017,000.00	1,157,250.00	826,610.00	725,550.00	Travel Allowance during leave for employees
7	Bonus	15,304,541.45	6,212,401.00	5,201,256.00	16,172,807.00	12,119,052.00	Bonus for employees
8	Group insurance	395,000.00	320,000.00	322,458.00	0.00	0.00	An insurance policy for all permanent employees
9	Employees State Insurance	0.00	0.00	236.00	555,301.00	5,055,291.00	This head is no longer active.
10	Labour Welfare Fund	180,000.00	43,299.00	43,767.00	43,870.00	40,398.00	Outlay for labour welfare schemes
11	Union Agreement Fund	0.00	0.00	0.00	0.00	0.00	The amount deposited in this fund is agreed upon mutually by the Transport Committee and TMTU Employees Union.
12	Pension	2,374,267.64	1,121,270.00	443,562 00	402,359.00	1,191,280.00	This amount is annually given to retired personnel of TMTU.
13	Assistance for housing	100,000.00	0.00	0.00	0.00	0.00	Financial assistance provided to staff for their residential requirements.
14	Travel Allowance / Dearness Allowance	18,862.91	10,597.00	11,925.00	10,426.00	20,389.00	Allowance to all employees of TMTU for daily travel. This does not include officials currently using/entitled to use TMTU vehicles.
15	Officers Accommodation Rent	72,000.00	0.00	0.00	0.00	15,195.00	Though no entry has been made under this head, it continues to be in the budget. This is the amount given to officers to cover their rent bills for their accommodation.
16	Expenditure towards permits	45,000.00	109,201.00	27,350.00	49,100.00	15,388.00	Expenditure incurred for obtaining permits such as Stage Carriage bus permits

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
17	Expenditure towards Interviews	22,497.00	772.00	2,000.00	0.00	1,237 00	Expenditure incurred for hosting interviews of potential candidates for various employee opportunities within TMTU
18	Uniforms	2,600,000.00	1,187,474 00	338,504 00	1,243,216 00	1,942,863 00	Annual expenditure incurred in purchasing uniforms for employees
19	Expenditure on injured employees	100,000.00	19,358 00	40,375.00	6,240.00	11,291 00	Expenditure incurred towards medical treatment of employees injured while being on duty Reimbursement/billing of expenses is done on production of actual bills
20	Training/Tours	200,000.00	463,860 00	380,270 00	437,812 00	293,612 00	Expenditure incurred in training of personnel, both staff and officials, and tours undertaken by various officials
21	Advt. for recruitment, tenders, etc.	218,389.09	357,335 00	741,266.00	350,400.00	234,653 00	Expenditure for advertisements in local dailies, select national dailies, and employment news
	Sub-Total (A.2.2)=(1 to 21)	211,557,413.73	187,968,579.00	156,903,777.00	145,201,746.00	119,267,461 00	
A.2.3	Variable Costs - Administration Department						
	Depots						
1	Printing of forms, registers, etc.	934,070.18	770,351 00	592,150 00	577,182 00	246,605 00	Expenditure incurred in printing of forms and registers from private contractors
2	Stationery/Xerox	600,000 00	467,451 00	297,555.00	291,121.00	508,481 00	Expenditure incurred for items like paper, carbon paper, toner, pens, pencils, etc

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of Item
3	Purchase of books	490 91	5,675.00	1,470.00	2,195.00	1,669.00	Self explanatory
4	Telephone Bills + Maintenance	766,229.45	671,752.00	581,829.00	554,146.00	260,436.00	Expenditure incurred towards purchase and maintenance of landline telephone instruments, mobile phones, and the billing expenditure incurred over their use.
5	Inauguration expenses	102,816.00	173,221.00	281,254.00	256,062.00	104,489.00	Expenditure incurred for inauguration of bus terminals, flag hoisting ceremonies on Independence Day and Republic Day, etc.
6	Transport Manager's Tea Expenses	25,000 00	22,659.00	24,027.00	12,362.00	15,973.00	Expenditure incurred for tea and meetings hosted by the Transport Manager, TMTU.
7	Chairman's Tea Expenses	60,000 00	159,354 00	92,366.00	76,196.00	57,734.00	Expenditure incurred for tea and meetings hosted by the Chairman, TMTU.
8	Meeting and inspection expenses	87,778.91	127,174 00	28,838.00	44,880.00	398.00	Expenditure incurred for hosting meetings by the Transport Committee and inspections undertaken
9	Postage expenditure	40,952.73	16,998.00	17,076.00	12,887.00	11,091.00	Self explanatory
10	Bank charges, *commission, etc*	28,664.73	65,111.00	289,861.00	111,191.00	192,729.00	Self explanatory
11	Typewriter, Xerox, computer maintenance	50,000.00	54,022.00	115,900.00	116,825.00	56,595.00	Self explanatory
12	Expenditure towards computers	400,000 00	442,454.00	410,883.00	321,737.00	376,111.00	Costs for purchase of spares for computers and peripherals like printers, etc.
13	Gift expenditure	10,000.00	0.00	0.00	0.00	0.00	Expenditure incurred towards gifts for retiring

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
							employees.
14	Staff Welfare Cultural Expenses	550,860.00	33,809.00	38,387.00	2,502.00	12,551 00	Various cultural programmes that may be organized for the staff
15	Entertainment expenditure	0.00	5,665.00	9,043.00	13,675 00	4,742 00	Indoor games items like carom, cards, etc.
16	Legal and consultancy charges	174,170.18	774,044.00	468,640 00	280,555 00	125,002 00	These services are provided by the private sector in the absence of a legal department within TMTU. It serves to provide consultancy in times of contract negotiations settlement of disputes requiring legal intervention, etc
17	Building repairs	3,286,909.09	1,812,611.00	1,547,676 00	1,295,543.00	1,158,564 00	Expenditure incurred towards maintenance of various depot, administration, workshop traffic department, and terminal buildings
18	Electrical goods	100,000 00	0 00	0 00	0.00	0 00	Various electrical goods purchased such as tube lights, bulbs, wires, etc
19	Electricity charges	2,928,589.71	1,967,687 00	1,358,099 00	1,005,811 00	471,397 00	Consolidated bill towards power consumed by the various departments of TMTU. Separate expenses not available
20	Water charges	100,000.00	352,231.00	28,801 00	35,682.00	24,568 00	Consolidated bill towards water consumed by the various departments of TMTU. This includes water consumption for cleaning of buses, apart from the normal uses of cleaning

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
							and drinking. Separate bills not available
21	Advances	5,900,000 00	4.245,382.00	17,764,555.00	5,353,762.00	7,147,568.00	Advances given to employees on request.
22	Tender refund	0 00	0.00	0.00	1,231,517.00	47,595.00	Refund of the amount deposited at the time of tendering by various private sector entities.
23	Incidental expenditure	100,000.00	46,164.00	93,930.00	0.00	14,229.00	Self explanatory
24	Miscellaneous expenditure	27,613.09	27,427.00	28,522.00	16,078.00	23,197.00	Self explanatory
	Sub-Total (A.2.3)=(1 to 24)	16,274,144.99	12.241,242.00	24,070,862.00	11,611,909.00	10,861,724.00	
A.2.4	Variable Costs - Workshop Department						
	Workshops						
1	Spare parts, etc	29,765,457 82	18.390,168 00	15,025,992 00	14,779,983.00	14,998,185.00	Expenditure incurred for various spare parts like nuts, bolts, wiring, light bulbs, horns, etc.
2	Batteries purchase and maintenance	888,000.00	740,547 00	655,428 00	1,274,104.00	1,466,451.00	Purchase and maintenance of batteries including distilled water, plates, etc.
3	Body and chassis maintenance	2,179,000 00	1.992,127 00	2,139,880.00	1,913,137.00	2,218,001.00	Minor repairs of bus-bodies, chassis including brake fluids, etc.
4	Auto-electrical equipment and maintenance	1,934,000.00	1,359,502.00	1,169,495.00	1,186,046.00	2,218,001.00	Electrical and mechanical equipment like drills, spanners, etc.
5	Painting of vehicles	210,000.00	164,252.00	361,478.00	267,261.00	181,462.00	Painting of vehicles including paint, thinner, brushes, spray guns, etc.
6	Welding equipment purchase	236,000.00	123,672.00	142,383.00	140,802.00	73,172.00	Equipment for welding required for repair including acetylene cylinders, etc.
7	Repair by private	3,439,000.00	2.824,995.00	2,097,009.00	2,381,611.00	1,507,345.00	Major body repairs that

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
	sector						may not be done by TMTU Workshop on account of the large capital investment required for such machinery and equipment.
8	Purchase of tyre tubes	6,819,291.27	7,560.487.00	6,971,450.00	4,788,520.00	6,764,539.00	Purchase of new tyre tubes.
9	Tyre remoulding	3,645,691.64	3,815,021.00	5,583,791.25	4,844,829 00	4,359,857 00	Retreading of tyres
10	Major bus body repairs	300,000.00	1,469,318.00	168,247.00	139,370 00	714,422 00	Major bus body repairs that are undertaken by the workshop
11	Cotton waste	373,000.00	286.972.00	284,278.00	361,663.00	456,474 00	Material including cloth for cleaning of buses, vehicles, engine maintenance, etc
12	Electrical goods	97,529.45	215,601 00	253,040 00	88,872 00	50,101.00	Various electrical goods purchased such as tube lights, bulbs, wires, etc
13	Fire extinguishers	15,000.00	0.00	0.00	0.00	0 00	Fire extinguishers that are changed/refilled periodically These are required in the workshop on account of presence of inflammable material within its premises
14	Miscellaneous tools	20,000.00	12,507.00	8,782.40	4,154.00	495 00	Self explanatory
15	Miscellaneous expenditure	235,936.36	58,438.00	58,101.00	51,833.00	49,915 00	Self explanatory
	Sub-Total (A.2.4)=(1 to 15)	50,157,906.55	39,013,607.00	34,919,354.65	32,222,185.00	35,058,420.00	
A.2.5	Variable Costs - Traffic Department						
	Buses						
1	Printing of tickets	1,818,174.55	1,305,266 00	1,415,981.00	1,501,791 00	1,832,020.00	Expenditure incurred for printing of tickets by private contractors
2	Ticket trays, punches.	105,000.00	36,420.00	24,403.00	26,048.00	239,084 00	Expenses for various

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
	conductor bags, etc.						sundry items like ticket trays, punches and bags for conductors, etc.
3	First Aid expenditure for passengers	57,014.18	9,780.00	5,000.00	11,500.00	6,030.00	Expenditure towards First Aid equipment like Band-Aids, anti-septic creams, etc. for minor injuries during travel in buses.
4	Printing of time-tables, books, etc	1,000.00	0.00	0.00	0.00	0.00	Expenditure incurred for printing of time-tables and books by private contractors
5	Miscellaneous expenditure	4,779.27	4,553.00	14,609.00	11,257.00	8,309.00	Other unforeseen minor expenditure that may be incurred from time to time.
6	Compensation for accidents	500,000 00	400,000.00	0.00	0.00	0.00	Expenditure incurred in lieu of damage in any manner to vehicles, people, etc. caused by either buses or vehicles belonging to TMTU.
7	Purchase of diesel, fuel	136,052,792 73	113,459,881.00	94,492,734.00	63,496,706.00	40,462,918.00	Purchase of diesel for buses and vehicles
8	Purchase of lubricants	3,381,476 73	4,006,245.00	4,739,026.00	4,015,112.00	4,396,620.00	Lubricants like engine oils, grease, etc.
	Sub-Total (A.2.5)=(1 to 8)	141,920,237.45	119,222,145.00	100,691,753.00	69,062,414.00	46,944,981.00	
	Sub-Total (A.2)=(A.2.1 to A.2.5)	422,709,702.71	360,070,941.00	317,600,537.45	259,506,771.39	214,346,559.33	
A.3	Taxes and other Liabilities						
A.3.1	Taxes						
	Buses						
1	Bombay Motor Vehicle Tax	1,636,358 18	1,217,281.00	1,165,322.00	1,070,404.00	1,033,767.00	This is an annual tax payable by all buses and applied on the following bases:

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
							a) Rs. 71.00 per seat annum and Rs 18 00 per standee per year. (Buses in TMTU have a seating capacity of 44 14 and standing capacity of 14 04) b) For buses plying within municipal limits, only 2/3 of this is levied
2	Child Nutrition Tax	13,325,420.73	12,542,881.00	11,421,687.00	11,895,815.00	11,771,327 00	This tax levied on all passengers on TMTU buses and collected by TMTU This is calculated at the following rate a) For all fares below Rs 2 00, 10 paise per ticket b) For all fares starting and above Rs. 2.00, 15 paise per ticket
3	Passenger Tax	15,363,174.55	14,125,014 00	11,920,609 00	10,061,125 00	8,830,190 00	This tax is calculated at the following rate 3 5% of the balance fare of each ticket after deduction of Child Nutrition Tax i e 3 5% of (Ticket fare minus 10 or 15 paise as the case may be)
4	Octroi	7,690,909.09	7,241,337 00	8,176,767 00	4,970,981 00	3,913,432 00	
	Depots						
5	Railway Land Revenue Tax	125,000.00	0.00	103,862.00	94,422.00	253,729 00	This amount is paid as rent for using railway land as a temporary day time depot
	Sub-Total (A.3.1)=(1 to 5)	38,140,862.55	35,126,513.00	32,788,247.00	28,092,747.00	25,802,445.00	
A.3.2	Insurance						
	Depots						

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of Item
1	Property Insurance	455,000.00	2,932,288.00	2,594,513.00	3,709,495.00	3,056,749.00	As per policy.
	Buses						
2	Vehicle Insurance	1,000,000.00					As per policy.
3	Cash-in-office Insurance	16,000.00					As per policy.
	Sub-Total (A.3.2)=(1 to 3)	1,471,000.00	2,932,288.00	2,594,513.00	3,709,495.00	3,056,749.00	
	Sub-Total (A.3)=(A.3.1+A.3.2)	39,611,862.55	38,058,801.00	35,382,760.00	31,802,242.00	28,859,194.00	
	TOTAL for SECTION: A (A.1 to A.3)	524,788,282.09	459,200,486.44	412,758,707.50	347,698,919.12	297,686,799.34	
Section B: REVENUE STREAMS							
B.1	Traffic Earnings						
	Buses						
1	Ticket earnings	420,692,241.36	406,728,818.00	343,970,197.00	292,796,611.00	258,962,682.00	Earnings from passengers as per existing tariff.
2	Concession earnings	12,570,697.85	8,989,419.00	8,484,407.00	6,727,172.00	5,146,450.00	Earnings from passes issued to students and passengers. These passes are issued on monthly, bimonthly and quarterly base
3	Luggage Rent	1,000.00	0.00	0.00	0.00	0.00	Rent collected on account of large volume of passenger luggage being transported through the bus. Rates flexible. No direct mechanism for calculation of this rent.
4	Fines (passengers)	375,866.25	283,205.00	506,345.00	296,820.00	314,019.00	Earnings through fines imposed on passengers traveling without paying the fare. The fine structure has two components: a flat component of Rs 50

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
							and a variable component of the amount of fare that may be charged for the passenger trip from its origin
5	Excess from conductors	28,790.63	0.00	0 00	956.00	598 00	Amount over the fare untendered by conductor to passengers on issuing tickets
6	Earnings from Police Grant	8,775,000.00	5,855,513.00	5,749,601.00	3,487,451.00	3,064,236.00	Amount earned on account of permitting free travel for police personnel This amount is realized from the Police Department on the following basis Average Fare x 2 trips x (No. of police personnel / 3) The remaining amount is given as concession
7	Sale of time-table booklets	1,000.00	0.00	0 00	0.00	0.00	Amount that may be realized through sale of timetable and booklets pertaining to TMTU bus operations
8	Refund on Child Nutrition Tax	333,135 52	559,009 00	109,064 00	228,414 00	447,728 00	Amount refunded to TMTU under the Child Nutrition Tax head as collection charges on the following basis. 2 5% of total amount under the Child Nutrition Tax
	Sub-Total (B.1) = (1 to 8)	442,777,731.60	422,415,964.00	358,819,614.00	303,537,424.00	267,935,713.00	
B.2	Non - Traffic Earnings						
	Depots						

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
1	On contract	1,000.00	0 00	0.00	0.00	0.00	For buses, which may be leased out to schools, commercial enterprises, group housing societies, etc. TMTU currently runs two buses, with two trips for each bus, everyday for schools run by Thane Municipal Corporation free of cost.
2	Advertisements on vehicles	2,200,000.00	2,411,567 00	1,960,206.00	1,348,480.00	1,796,752.00	Earnings through advertisements carried on the buses. The rates of these are charged flat per bus. These have recently been let out to private contractors through a transparent tendering process.
3	Advertisements on sheds	255,000.00	0 00	0.00	0.00	0.00	These have recently been let out to private contractors. These were decided through the open tendering process and the highest bidder was awarded the rights to operate and maintain these sheds for a certain period of time.
4	Advertisements on tickets	1,000.00	0.00	0.00	0.00	0.00	There are currently no advertisements on tickets. However, an opportunity has been identified for revenue generation and may be captured in the future.
5	Interest	1,000.00	26.00	77.00	469.00	1,181.00	Interest earned on various

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
							investments, deposits made by employees, and savings with the bank
6	Compensation	355,000.00	36,205.00	33.049.00	16,420.00	36,640 00	Compensation claimed in lieu of damage incurred by property or vehicles and buses owned by TMTU
7	Tender fees	75,000.00	267,815.00	64.100.00	60,230 00	28,000 00	Fees for processing of various tenders issued by TMTU.
8	Auction sale	5,000.00	0.00	0.00	0.00	0 00	Sale of unclaimed/lost baggage, umbrellas, etc left behind by passengers in buses and unclaimed This is auctioned with no pre-bid price
9	Fines (Employees)	38,152.50	109,563.00	76.255.00	93,332 00	87,538 00	Fines levied on employees for inefficient performance, namely reporting late for duty, causing accidents, rash driving based on passenger complaints, etc
10	Miscellaneous	225,000 00	502,723.00	252,461 00	207,477 00	362,959 00	Self explanatory
11	Tender deposits	650,000.00	5,726,489.00	3,848,959 00	3,897,686 00	5,208,785 00	Self explanatory
	Workshops						
12	Sale of scrap	1,500,000.00	2,072,348.00	1,300.00	0.00	514,728 00	Sale of materials/equipment, etc. that has outlived its useful life and may be disposed However, disposal of any property, goods etc. may only be done by TMTU if the expected value of sale is less than Rs 10,000.00
	Sub-Total (B.2) = (1	5,306,152.50	11,126,736.00	6,236,407.00	5,624,094.00	8,036,583.00	

		2002-03	2001-02	2000-01	1999-00	1998-99	Description of item
	to 12)						
	TOTAL for SECTION: B (B.1 to B.2)	448,083,884.10	433,542,700.00	365,056,021.00	309,161,518.00	275,972,296.00	
	Deficit/surplus	-76,704,397.99	-25,657,786.44	-47,702,686.50	-38,537,401.12	-21,714,503.34	

E Performance of Urban Public Transport Undertakings in India

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Km Utilization												
Mumbai	202.50	208.90	200.70	212.70	219.40	209.70	206.20	203.60	202.50	209.20	199.80	194.90
Delhi	233.00	219.20	213.10	211.90	215.90	251.30	270.10	267.70	231.70	217.30	189.30	85.00
Chennai	231.40	227.00	228.40	231.30	237.60	258.10	265.50	258.10	247.50	257.30	213.20	205.90
Chennai	0.00	0.00	0.00	0.00	180.60	232.20	241.90	234.60	234.30	246.00	207.60	205.90
Kolkata	163.70	169.00	175.50	180.00	183.00	190.80	192.10	193.40	194.50	193.10	132.50	100.80
Ahmedabad	193.10	187.60	188.40	188.20	196.60	195.50	200.50	203.60	204.50	203.40	172.40	167.10
Pune	223.10	221.10	224.20	232.50	239.80	246.70	248.50	247 60	249.90	247.40	209 60	197.70
Chandigarh	232.10	0.00	256.10	272.40	284.80	291.40	290.40	302.80	309.20	305.00	297.60	306.30
Pimpri	240.00	301.60	303.00	0.00	286.40	282.90	279.20	270.70	269.20	291.50	168.20	193.90
Thane	166.00	191.30	192.20	0.00	207.70	190.00	193.20	187.80	183.90	185.40	169.70	190.60
Sholapur	206.00	205.90	166.70	178.70	0.00	243.00	0.00	235.00	245.00	247 60	0.00	0.00
Kolhapur	217.00	212.70	219.10	226.20	235.40	228.30	235.40	243.00	242.00	246.70	235.50	227.10
Bangalore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0 00	212.70	217 80	208.70
Fleet Utilization												
Mumbai	0.83	0.82	0.90	0.92	0.94	0.95	0.94	0.94	0.94	0.94	0.95	0.92
Delhi	0.89	0.86	0.86	0.88	0.88	0 66	0.54	0.62	0.86	0.90	0 86	0 72
Chennai	0.88	0.87	0.85	0.85	0.85	0.96	0.91	0.90	0.87	0.86	0.83	0.82
Chennai	0.00	0.00	0.00	0.00	0.88	0.90	0.91	0.89	0.85	0.85	0.85	0 82
Kolkata	0.75	0.80	0.77	0.74	0.70	0.69	0.73	0.73	0.74	0.67	0.68	0.67
Ahmedabad	0.83	0.82	0.82	0.80	0.80	0.82	0.85	0.85	0.81	0.84	0.83	0.81
Pune	0.88	0.88	0.90	0.89	0.89	0.89	0.86	0.81	0.85	0.86	0.86	0.82
Chandigarh	0.92	0.00	0.95	0.96	0.95	0.92	0.93	0.92	0.94	0.94	0.94	0.95
Pimpri	0.59	0.47	0.50	0.00	0.51	0.61	0.75	0.74	0.98	0.61	0.61	0.61
Thane	0.44	0.85	0.85	0.00	0.81	0.92	0.90	0.89	0.89	0.80	0.88	0.91
Sholapur	0.84	0.81	0.90	0.92	0.00	0.85	0.00	0.66	0.61	0.51	0.00	0.00
Kolhapur	0.77	0.84	0.84	0.91	0.92	0.89	0.87	0.85	0.86	0.70	0.56	0.61
Bangalore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.95	0.95

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Occupancy Ratio												
Mumbai	0.93	0.97	0.91	0.79	0.84	0.87	0.87	0.83	0.74	0.73	0.76	0.55
Delhi	1.58	1.61	1.62	1.34	1.17	1.18	1.28	1.21	1.21	1.32	1.32	0.83
Chennai	1.30	1.38	1.39	1.41	1.42	1.32	1.27	1.36	1.25	1.29	1.33	0.87
Chennai	0.00	0.00	0.00	0.00	1.36	1.29	1.23	1.36	1.31	1.31	1.34	0.87
Kolkata	1.17	1.17	1.12	1.12	1.17	1.03	1.03	1.02	0.96	0.88	0.90	0.74
Ahmedabad	0.67	0.76	0.91	0.84	0.81	0.80	0.83	0.89	0.83	0.79	0.74	0.53
Pune	0.95	0.84	0.86	0.84	0.81	0.80	0.83	0.89	0.83	0.79	0.69	0.45
Chandigarh	1.01	0.00	0.82	0.78	0.80	0.87	0.82	0.93	0.92	0.85	0.81	0.83
Pimpri	0.00	0.63	0.68	0.00	0.64	0.72	0.76	0.77	0.00	0.46	0.44	0.34
Thane	0.78	0.84	0.83	0.00	0.00	0.93	1.32	1.01	0.86	0.88	0.67	0.71
Sholapur	0.83	1.51	0.00	0.00	0.00	0.00	0.00	0.55	0.55	0.64	0.00	0.00
Kolhapur	1.03	1.00	1.07	1.08	0.96	0.74	0.65	0.62	0.57	0.55	0.56	0.39
Bangalore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.90	0.58
Staff per Bus												
Mumbai	14.12	14.09	11.93	12.80	0.00	12.56	12.59	12.20	12.01	11.99	11.82	12.00
Delhi	10.77	11.06	10.25	11.39	11.80	14.18	18.30	17.92	12.74	11.80	11.65	15.32
Chennai	9.89	9.88	10.35	8.66	0.00	9.60	8.19	8.66	8.94	9.01	9.21	8.38
Chennai	0.00	0.00	0.00	0.00	7.65	8.84	7.61	7.61	8.72	8.40	8.44	8.38
Kolkata	15.73	15.88	13.44	13.48	0.00	14.06	12.61	11.73	11.90	12.50	11.53	10.77
Ahmedabad	10.60	11.36	10.38	10.00	10.24	10.03	9.73	9.73	8.71	8.98	8.78	9.47
Pune	10.71	10.70	10.50	10.09	10.14	10.19	11.44	10.65	10.11	10.56	10.45	10.29
Chandigarh	6.73	0.00	6.92	6.44	6.41	6.54	6.37	6.38	6.00	6.11	6.06	5.86
Pimpri	10.76	13.01	15.33	0.00	16.06	13.93	13.01	13.12	13.44	14.67	15.52	14.13
Thane	20.83	10.83	10.81	0.00	11.07	12.00	13.11	10.99	12.16	13.40	12.00	11.43
Sholapur	10.36	10.30	10.03	11.11	0.00	8.39	0.00	15.68	7.08	8.66	0.00	0.00
Kolhapur	12.73	10.84	11.74	11.84	11.74	12.61	10.32	10.65	10.90	12.61	12.13	13.93
Bangalore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.83	6.48	6.04

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Km per Liter												
Mumbai	3.07	3.07	3.10	3.14	2.92	2.88	2.99	3.00	3.05	3.06	3.01	3.04
Delhi	3.74	3.80	3.80	3.79	3.80	3.81	3.82	3.79	3.80	3.76	3.75	3.80
Chennai	3.53	0.00	3.59	3.58	3.56	3.52	3.57	3.63	3.65	3.58	3.57	3.53
Chennai	0.00	0.00	0.00	0.00	3.58	3.61	3.60	3.65	3.62	5.59	3.55	3.53
Kolkata	3.01	3.08	3.38	3.41	3.30	3.32	3.30	3.33	3.30	3.30	3.36	3.46
Ahmedabad	4.00	3.97	3.84	3.89	3.81	3.73	3.77	3.65	3.64	3.67	3.66	3.70
Pune	3.50	3.51	3.56	3.57	3.51	3.52	3.52	3.44	3.52	3.48	3.43	3.42
Chandigarh	3.43	0.00	3.65	3.76	3.80	3.78	3.73	3.76	3.82	3.93	3.97	4.00
Pimpri	3.37	3.39	3.62	0.00	3.34	3.40	3.47	3.52	3.65	3.70	3.63	3.83
Thane	3.21	3.10	3.13	0.00	3.22	3.25	3.27	3.31	3.33	3.38	3.30	3.31
Sholapur	3.65	3.65	3.74	3.60	0.00	3.53	0.00	3.62	3.69	3.85	0.00	0.00
Kolhapur	3.63	3.63	3.69	3.59	3.61	3.60	3.60	3.54	3.60	3 49	3.51	3.61
Bangalore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.10	4.26	4.31
Fleet Strength												
Mumbai	2051	2143	2548	2786	2892	3016	3057	3113	3221	3259	3458	3430
Delhi	3860	3722	3750	3665	3247	2313	1722	1648	2969	4546	3094	1932
Chennai	2039	2006	1980	2005	1785	1021	1137	1183	1316	1283	1497	2816
Chennai	0	0	0	0	1029	1038	1114	1112	1132	1283	1348	2816
Kolkata	837	843	914	927	858	860	877	875	816	780	1212	1268
Ahmedabad	602	594	612	593	604	589	598	659	693	738	942	886
Pune	473	494	527	589	624	661	699	626	686	678	750	824
Chandigarh	315	0	341	375	393	375	383	378	388	391	417	417
Pimpri	141	130	137	0	128	150	165	163	156	140	215	232
Thane	30	58	60	0	89	124	162	193	192	197	246	248
Sholapur	69	70	94	115	0	106	0	97	91	74	0	0
Kolhapur	63	74	83	96	108	113	139	132	120	94	127	101
Bangalore	0	0	0	0	0	0	0	0	0	0	2169	2287

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